

GENERAL SEMANTICS

Introduction by Alfred Korzybski

ARROW EDITIONS
NEW YORK, 1938

GENERAL SEMANTICS

Papers from the First American Congress

for General Semantics

Organized by Joseph C. Trainor

and Held at Ellensburg, Washington

March 1 and 2, 1935

With an introductory "Outline of General Semantics"

by Alfred Korzybski

and Other Related Contributions

Collected and arranged by Hansell Baugh

Distributed by Arrow Editions, 444 Madison Avenue, New York

1 9 3 8

Copyright 1936
by the Institute of General Semantics
1330 East 53 Street, Chicago

Manufactured in the United States of America

N O T E

- * The two papers on the Congress program whose titles are marked each by an asterisk were not obtainable for inclusion in the present collection. The program is reproduced here without the changes in several titles that would bring it into exact correspondence with those of the papers in their actual manuscript-form.

Count Korzybski's three addresses are in large part reproduced in his "Outline of General Semantics", which opens the present collection of papers.

PROGRAM OF THE FIRST AMERICAN CONGRESS FOR GENERAL SEMANTICS
Washington State Normal School, Ellensburg, Washington

Friday, March 1, 1935

- 10 a.m. Address of Welcome: Dr. R. E. McConnell, President
"The Significance of General Semantics": Count Alfred Korzybski
- 2 p.m. Reading of Papers from Related Fields of Science
- 7:30 p.m. Reading of Papers Relating to Medicine and Psychiatry
"The Relation of General Semantics to Medicine": Count Korzybski

Saturday, March 2, 1935

- 11 a.m. Reading of Papers Relating to Education
- 1:30 p.m. "Education and General Semantics": Count Korzybski

Papers from Related Fields of Science

- Anthropology: "Subverbal, Verbal and Superverbal Logics"
Prof. Selden Spenser, Ellensburg Normal School
- Biology: "Darwin and the Theory of Knowledge"
Prof. William E. Ritter, University of California
"A Preliminary Discussion of the Application of General Semantics to Biology"
Prof. Frederick Macdonald, Institute of Biology, Harvard University
- Business: "Some Experiences with the Application of General Semantics"
Charles Cean, Osborn, Ohio
- Education: "Some Results of Extensional Training of Mentally Retarded Pupils"
Harold Potter, Olympia, Washington, Public Schools
"The Problem of Terminology in Education"
Prof. C. E. Hugh, University of California
"Experimental Results of Semantic Training on Intelligence-Test Scores"
Prof. Joseph C. Trainor, Ellensburg Normal School
"Four-dimensional Space-time Education"
Core Williams, The Williams Institute, Berkeley, Calif.
- Genetics: "The General Formula of Heredity in the Light of Korzybskian Science"
Dr. Harry H. Laughlin, Eugenics Record Office, Carnegie Institute, Washington, D. C.
- Journalism: "The Place of General Semantics in Journalism"
A. B. Tyler, Albany, N. Y., Evening News
- Logic: *"Basic Technique of Language"
Prof. E. C. Sisson, Reed College, Portland, Oregon
"Multi-Valued Logics"
Prof. William H. Malisoff, University of Pennsylvania
- Mathematics: "Mathematics and General Semantics"
Prof. Cassius J. Keyser, Columbia University
- Penology: *"A Brief Report of Experimental Work"
Miriam Van Waters, Massachusetts Reformatory for Women
- Philosophy: "A Non-Aristotelian System and General Semantics"
Prof. C. L. Seiser, University of Pittsburgh
- Physiology: "A New Collection-Physiological Psycho-Logics"
Prof. W. Burridge, University of Lucknow, India
- Psychiatry: "Preliminary Report of Two Cases of Psychopathic Personality with Chronic Alcoholism Treated by the Korzybskian Method"
Dr. John G. Lynn, McLean Hospital, Waverly, Mass.
- Psychology: "A Technique for Inter-translating Psychological Theories"
Prof. Joseph C. Trainor, Ellensburg Normal School
"General Semantics and Gestalt Psychology"
Prof. Raymond H. Wheeler, University of Kansas
- Sociology: "Case Work and the Art of Thinking"
Sydney Maslen, The Charity Organization Society, New York City

CONTENTS

INTRODUCTION

Alfred Korzybski: An Outline of General Semantics.	1
--	---

MATHEMATICS AND LOGIC

Cassius Jackson Keyser: Mathematics and the Science of Semantics	29
* Alfred Korzybski: Extensionalization in Mathematics, Mathematical Physics, and General Education. General Semantics	31
Oliver L. Reiser: Non-Aristotelian Systems and General Semantics.	36
William Marius Malisoff: Meanings in Multi-Valued Logics	40
Selden Smysler: Logics: Subverbal, Verbal, and Superverbal.	43

PSYCHOLOGY AND LINGUISTICS

Raymond H. Wheeler: General Semantics and Gestalt Psychology	46
Joseph C. Trainor: A Technique for Inter-translating Psychological Theories	50
C. E. Fugh: Semantics and Pragmatism	51

EDUCATION

* Joseph Brewer: Education and the Modern World.	54
Joseph C. Trainor: Experimental Results of Training in General Semantics upon Intelligence Scores	58
Harold M. Potter: Some Results of Extensional Training of "Mentally Retarded" Pupils	62
* M. M. Kendig: Language Re-orientation of High-School Curriculum and Scientific Control of Neuro-linguistic Mechanisms for Better Mental Health and Scholastic Achievement	65
Cora L. Williams: Report of Experiment Made by the Williams Institute.	70

SOCIOLOGY

A. Ranger Tyler: The Place of General Semantics in Journalism.	73
Charles H. Owen: A Business Man's Experience with Korzybski's "Science and Sanity".	75
Sydney Maslen: Casework and the Art of Thinking.	76

BIOLOGY AND PSYCHIATRY

Harry H. Laughlin: A Semantic View of the General Formula of Heredity.	78
Roderick Macdonald: A Preliminary Discussion of the Application of General Semantics to Biology	82
W. B. Ritter: Charles Darwin and the Problems of Morals.	83
W. Burrige: A New Colloidal-Physiological Psycho-Logics.	84
* D. G. Campbell and C. B. Congdon: A Report on the Psychotherapeutic Application of General Semantics	86
John G. Lynn: Report of Two Cases of Psychopathic Personality with Chronic Alcoholism Treated by the Korzybskian Method	90
* Douglas Gordon Campbell: Neuro-linguistic and Neuro-semantic Factors of Child Development	100

BIBLIOGRAPHICAL LIST

Some Publications Relating to General Semantics.	109
--	-----

SUPPLEMENT (inserted)

Scientific Opinions of Korzybski's "Science and Sanity"	
---	--

* Not on the program of the Ellensburg Congress.

OUTLINE OF GENERAL SEMANTICS (1)

The Application of Some Methods of Exact Sciences to the Solution of Human Problems and the Educational Training for General Sanity (2)

By Alfred Korzybski
Institute of General Semantics, Chicago

Definition of General Semantics

General Semantics formulates a new experimental branch of natural science, underlying an empirical theory of human evaluations and orientations; involving a definite neurological mechanism, present in all humans. It discovers direct neurological methods for the stimulation of the activities of the human cerebral cortex and the direct introduction of beneficial neurological 'inhibition', which restores nervous balance to the over-stimulated human nervous systems. It discovers also that most human difficulties are due to intensional orientations and languages and the solution of many of them can be brought about by extensional orientations and languages, which is accomplished simply and automatically by a few elementary linguistic extensional devices. 'The meaning of a term in extension consists of the objects to which the term may be applied; its meaning in intension consists of the qualities which are possessed by objects bearing the name.' (Jevons.) In the case of General Semantics we deal with intensional and extensional orientations and attitudes, which represent a broader problem than the one defined by Jevons.

Intensional orientations are based on verbal definitions, associations, etc., largely disregarding observations as if they would involve a 'principle' of 'talk first and never mind life facts'. Extensional orientations are based on ordering observations, investigations, etc., first, and the verbalization next in importance. Thus the extensional attitudes are based on the natural order of evaluation, making a natural theory of values possible, and leads to a workable theory of adjustment or 'sanity'. Intensional orientations, then, represent the reversal of the natural order of evaluation, and must introduce factors of misvaluation or maladjustment in human lives. Further analysis is given on p. 8 - 14 of the present Outline.

General Semantics is not a medical science, but represents a necessary bridge between exact sciences, medical sciences (psychiatry included), home and existing school, etc., education, and daily life and daily orientations. General Semantics however gives direct neurological methods of training for adjustment and so prevention of maladjustment, etc., which neither neurology, nor medicine, nor education of the past had formulated in a generally workable form.

(1) Semantics: from the Greek semantikos, 'significant', from semainein, 'to signify', 'to mean'. For further data consult the index of Science and Sanity. An Introduction to Non-Aristotelian Systems and General Semantics, by Alfred Korzybski, Science Press Printing Co., Distributors, Lancaster, Pa. Further references to this work will be indicated only by pages, or chapters.

(2) Discussion presented in abstract before Section II of the Ninetieth Annual Meeting of American Psychiatric Association, June 1, 1934, New York City; of the paper by Doctor Reginald St. Elmo Murray entitled 'The Semantic Differential in Mental Hygiene'.

Paper presented in full before the First American Congress for General Semantics, held at the Central Washington College of Education, Ellensburg, Washington. - March 1 and 2, 1935.

Introduction

Enquiry shows that some extensional and other methods of modern mathematics, mathematical physics, physics, etc., can be applied to human problems. The application of these new methods is not only legitimate, but very necessary, and justified by the empirical results. No one will deny that organismal reactions are connected with 'chemistry', etc., but in the last twenty years 'chemistry' has become only a branch of sub-microscopic and sub-atomic physics, a problem of dynamic quantum structures, (processes) and so ultimately of multi-dimensional geometries (4). Organismal reactions, then, become problems of colloid-quantum dynamic structures, some of them being temporal or reversible, others quasi-permanent and irreversible (3).

The extremely rapid modern developments of physics with their astonishing applications, such as radio for instance, involve some crucial extensional methodological innovations, necessitating entirely new extensional psycho-logical orientations. First, although a sub-atomic physicist utilizes 'senses' to observe his instruments, yet his causal structural units are no longer 'sense' units but inferential units, which appear to be more reliable and fundamental than any low order symbols such as 'sense perceptions' can possibly give us, and which in fact our 'senses' cannot even register (5).

Human knowledge is structural (p.55-56) (4). Thus, to build any modern science we must look for, or assume, structure; and in dealing with sub-microscopic processes, colloids included, look for dynamic structure. The disregard of these issues introduces only vicious and un-scientific 1935 metaphysics, mysticism, etc., which hamper any science. In presenting this discussion the author must stress that modern education must be so revised as to give the students at least the rudiments of modern 1935 scientific methodology and extensional orientations, which is not the case at present. We must also consider a serious neurological difficulty - that, unless special educational efforts are made, present-day intensional education must train the students in antiquated methods and antiquated 'science'; yet false 'knowledge' is neurologically much more harmful than mere ignorance.

Any satisfactory science must be free in building known-in-principle verbal structures (theories), to be matched as to similarity with empirical data the structure of which we attempt to discover. Empirical results, or the lack of them, play a decisive role in this quest for structure, because it was shown (Russell) (4) that two similar structures have 'logical' characteristics in common, which similarity makes us 'understand' happenings, which is the aim of science (p.55-56). The freedom and flexibility in building theories for such matching of verbal with empirical structures, is what characterizes the modern creative scientists. In modern 1935 science no one is any longer shy in submitting existing theories to most radical revisions. Any useful theory must

(3) see: 1) Excitability, A Cardiac Study; 2) A New Physiology of Sensation, both Oxford Press; and 3) A New Physiological Psychology, by Professor W. Burrige, Arnold, 1933, London, and Williams & Wilkins, Baltimore. These works are frankly based on colloidal theories and experiments.

(4) These issues are really elementary and the literature is very large. As primers however: The Analysis of Matter, by Bertrand Russell; The Nature of the Physical World, by A. S. Eddington; The Wave Mechanics of Free Electrons, by G. P. Thomson; and Mathematical Philosophy, by C. J. Keyser, can be suggested.

(5) On the symbolic character of 'sense perception' consult any elementary physiology, but particularly Principles of Human Physiology, by E. H. Starling.

account for the older empirical facts and predict new facts which should be verified experimentally. Even in cases where a given theory occasionally does not seem to work, there must be a justification for this within the theory itself. If these conditions are disregarded we cannot have modern scientific theories, or more generally, modern science.

In 1936 there is not the slightest doubt that the extensional physico-mathematical sciences have at present achieved the greatest reliability. Thus, any science, to be modern, should try to apply at least some general physico-mathematical extensional methods, if not technique, in any field. Modern physicists, for instance, have fearlessly invented new mathematics to account for experimental facts. For example, in newer quantum theories, it was found that the traditional rules of arithmetic where $3 \times 3 \neq 3 \times 2 = 6$ were not sufficiently expedient; therefore new mathematics were created where 2×3 is not equal to 3×2 , ($2 \times 3 \neq 3 \times 2$), which proved of great usefulness (4).

The great flexibility of physico-mathematical orientations 1936, or lack of intensional psycho-logical prejudices and nervous blockages in the younger physicists and mathematical physicists is the result of the extensional work of Einstein and his followers, who eliminated from modern physics a very seriously hampering intensional psycho-logical orientation and nervous blockages. Thus, Einstein refused to accept the intensional, verbalistic, definitional 'absoluteness of simultaneity' and decided, perhaps unconsciously, to treat it extensionally, to judge by experimental facts and actual order in procedure, how we are getting at 'simultaneity' at all! This procedure has been termed by Professor Bridgman 'operational', a most excellent term as applied to physics, but which represents only a particular case of the most general type of human orientations, called here extensional orientations. This can be made equally operative in all human concerns, physics, as well as psychiatry, psychotherapy, education, etc., daily life included; which leads to general sane orientations in science and in life. Thus we have here an excellent example of how the extensional elimination of one intensional 'absolute' can rebuild a science, by liberating the scientists from undue self-imposed unconscious intensional verbalistic limitations, 'false knowledge', and consequent neuro-semantic blockages.(4).

Examples of extreme intensionalism abound everywhere; here only a few can be given. A hopelessly 'mentally' ill patient who for a period of time fancied himself to be 'Napoleon' and later changed this orientation for 'Caesar', when asked how this happened answered: 'I am Caesar by my other mother'. Thus by verbal intensional associations, etc., the answer sounds plausible, except that extensionally it has nothing to do with life, as it is biologically impossible to have two mothers.

In science we have for instance intensional arguments about the 'temperature of the electron', which extensionally is impossible (p.80). 'Absolute space', 'absolute time', 'absolute simultaneity', 'absolute identity', and other 'absolutes', are built by intensional verbal associations, definitions, etc., disregarding extensional facts. In mathematics the 'transfinite numbers' or 'Alephs' were an intensional product invented by a sick man, and are fundamentally unsound and in actuality useless because this invention disregards the extensional facts, and so it goes.

A modern scientific extensional analysis of human reactions discloses that at the foundations of human daily orientations there still persists a remnant of primitive 'false knowledge', embodied in a conscious or unconscious intensional belief in 'identity', which plays the role of an intensional 'absolute'. The complete extensional elimination of this harmful 'false knowledge' and 'absolute' is even more far-reaching and constructively revolutionary for human general orientations in life and science, than

the Einstein theory has been for physics. It allows us for the first time to base human general orientations and relations on modern extensional scientific methodology. The vicious 'false knowledge' and 'absolutes' play neuro-semanticly a causal role in our psychological reactions and so their elimination always leads to very far-reaching consequences which, in this case, become neuro-semanticly automatic and so unavoidable. Freud states in his last book that humans suffer from a 'constitutional incapacity' to be scientific about themselves. It is true that Freud was persecuted by the medical profession long enough to be prompted to enquire into the scientific standards of existing medicine. He does not realize, however, that the real difficulty is not in a 'constitutional incapacity', which somehow does not appear in modern exact sciences, but that the modern extensional physico-mathematical methodological advances are so new, and so entirely neglected as yet, that these most important very simple neuro-semantic factors in human general orientations have been discovered only lately. The results have not yet reached our home and school educations. General Semantics attempts this urgent neuro-semantic extensional task of modernizing general orientations in life, science, and education. It must be obvious that, as conditions of life are continually altered and made more complex by scientific discoveries, human nervous systems are overstimulated and humans cannot adjust themselves at their best, or be 'sane', while their nervous reactions and corresponding orientations belong to simpler intensional stages of human development of millenniums gone by. As yet, observations and experimental data seem to justify fully these conclusions.

As the ultimate value of the new science is extensional and neurological, it is to be judged by experiments, and the author must be free to build his own most expedient terminology, as no science is otherwise possible. Unfortunately, this neurological side of General Semantics is very new, and in a way unprecedented, so that the old nervous 'Bahnungs' ('law of facilitation', 'canalization'), and orientations bound up with them, make this task rather difficult, requiring nervous retraining. Modern scientists do realize that they cannot stand still and fulfill their obligations. To remain scientifically modern, physicians and educators must also follow the progress of other sciences and particularly of extensional physico-mathematical methodology, 1935.

The term 'neurological' is used here in a modern, and in a 1935 scientifically legitimate dynamic sense, which includes colloido-quantum configurations as established general mechanisms. The older static 'fibre', 'substance', etc., orientations, do not offer enough possibilities to account for the endless individual or group variations of the manifestations of life and psycho-logical reactions, but only obscure issues, and make modern scientific orientations impossible. In 1935 'fibre', 'substance', etc., represent only macroscopic, more stable dynamic configurations, and no matter how important, they cannot be considered as exclusively fundamental, or sufficient. The problem is not in knowing all details which we admittedly do not know, but to base our orientations on the dynamic process-character of all 'matter', which modern physics has solidly established (3).

Experimental Results

At present the experimental results are gathered from the fields of: 1) Psychotherapy, 2) Education: a) of sub-normal individuals, b) 'normal' individuals, 3) Individual cases among students who were keen enough to report. In the future, reports on results in semantic group-therapy should be expected. Although all available data indicate that General Semantics must exercise a powerful preventive role against avoidable semantic ills, the gathering of such data is very difficult, but a number of individuals have reported that if they had been trained earlier in the new semantic methods, their life and adjustment would have been more satisfactory.

At present, experimental results confirm the theoretical predictions. Doctor Philip S. Groven, a psychiatrist, St. Elizabeth's Hospital, Washington, D. C., writes: 'In addition to the scientists being considerably aided by the use of semantic methods, there is also another group directly affected; namely, the mentally disordered. By direct clinical applications I have found the new principles workable in this enormous group. My observations cover a period of about seven years. The major benefits seem to be that the physician deals directly with an automatic, general, neuro-physiological mechanism, the retraining of which shortens the time of the older psychotherapeutic treatments; that the results last better; that many cases which were considered "incurable" can be relieved; that the semantic methods could be applied to group therapy; and, what is perhaps the most important, General Semantics offers preventive educational measures against many future "mental" or nervous disturbances'.

Doctor H. Eckett Lang, Director Clinical Psychiatry, Pilgrim State Hospital, Brentwood, New York, writes: 'Personally I have found the application of the methods of General Semantics to personality deviations results in a correction of behaviour attitudes with a clearer and more concise ability to obtain results without severe expenditure of energy'.

Harold M. Potts, Principal of the Garfield School (Public Schools) Olympia, Washington, has reported his results in training a class of 'mentally retarded' pupils in the extensional methods of General Semantics; and J. C. Trainor, of the Department of Psychology and Education, Washington State Normal School, Ellensburg, Washington, has applied the methods of General Semantics to 'normal' classes. Their detailed reports appear elsewhere in the present collection of papers.

Individual reports to the author, and his own experience, confirm these experimental results, but additionally in some cases, infantilism, drunkenness due to maladjustment, serious blockages, etc., have been eliminated.

Outline of General Semantics

General Semantics is based on observations that existing natural sciences and semi-sciences about humans, education included, have mainly studied the activities which humans have in common with animals, disregarding such forms of unique human behaviour as scientizing and mathematizing, as human extensional nervous behaviour at its best; 'insanity' as human intensional nervous behaviour at its worst. General Semantics studies these forms of unique human behaviour, as nervous behaviour; collects, and sometimes revises other known data, and in the resulting synthesis unexpectedly discovers special aspects of automatic neuro-semantic and neuro-linguistic reaction mechanisms inherent in all humans. These human neuro-symbolic reaction-mechanisms are radically different from the animal neuro-signal reaction-mechanisms, because they function differently, and must have different microscopic and sub-microscopic dynamic structures, even in cases of macroscopic similarities. With the discoveries of physics (1935), a modern scientific analysis cannot disregard sub-microscopic structural issues.

The study of scientizing, mathematizing and 'mentally' ill as uniquely human nervous reactions, teaches us as much about the functioning of the human nervous system in connection with symbol-reactions, as the experiments of Pavlov on dogs and their saliva-food-reactions have taught us about the functioning of the animal nervous system, in connection with animal signal-reactions. A work on some new quantum mechanics or a tensor calculus is as much an empirical exhibit of the working of the human nervous system, as the number of drops of saliva in food experiments with animals is an empirical exhibit of the working of the animal nervous system, which are entirely different,

in spite of some superficial macroscopic similarities.

As the human nervous mechanisms are more complex and functionally more general, it turns out that humans can 'copy animals in their nervous reactions' (6), - in other words utilize their human neuro-symbolic mechanisms as animal neuro-signalic mechanisms; such 'copying' turns out to be pathological for humans in a great variety of degrees. The reverse is impossible. Animals, with their simpler, and functionally less general nervous mechanisms, cannot 'copy humans in their nervous reactions'. They live or die, but having no science they cannot make the unfit survive, or teach. Bees cannot train their offspring in the reactions of oysters. If they could, there would be no bees and no honey. Humans can, and actually do that sort of thing, and of course maladjustment, human tragedies, etc., follow, and the conditions of life which we have manufactured for ourselves, are far from satisfactory.

From these observations further consequences follow; for instance: 1) the majority of avoidable human private, social, economic, national, international and even scientific difficulties depend on this misuse of the human nervous system; 2) all existing home, school and university educations involve those pathological factors, and so we actually train our children toward the prevalent and general un-sanity, actively twist human character, actively lower native human intelligence, etc., without even suspecting it. The automaticity of this mechanism is of great practical importance because it appears that we can as easily train children in human healthy symbol-reactions as we at present train them in pathological animalistic signal-reactions. The nervous training of children and young people with the aid of the Structural Differential (Chapter XXIX) is extremely simple, once we know how; the extensional re-training of grown-ups is more difficult because of established neuro-semantic habits, ('Eahnung'), intensional structure of language, etc., but in most cases several months of persistent extensional training is sufficient to eliminate these pathological reactions. Of course in many instances there are also other pathological or other harmful, etc., factors involved, which General Semantics cannot alter.

Direct Extensional Neuro-linguistic Methods of Training

One of the most workable characteristics of General Semantics consists of the fact that neuro-semantic issues are strictly and inherently connected with neuro-linguistic extensional issues which work automatically. The last can be divided into two aspects: 1) The structure of the language used. 2) The intensional or extensional character of the language and corresponding orientations.

1) A language or a map for its main usefulness must be similar in structure to the facts or the territory. Thus a map which would represent San Francisco as between Chicago and New York would only be misleading. Similarly the prevailing elementalist language which splits verbally what cannot be separated empirically is not similar

(6) A selection of another term for 'copy' was difficult and laborious. This term was finally adopted because of its neurological implications. 'To copy' is defined as 'to reproduce after a pattern'. Thus if nervous impulses do not sufficiently engage the human cerebral cortex (see Fig. 2, p.193), animal or infantile distributions of nervous impulses are reproduced in patterns. Such distribution is natural with infants, yet through the 'law of nervous facilitation' when the reactions have their early nervous paths canalized, these infantile reactions, if not properly and actively counter-acted by special training, may become permanent through life. At present, outside of the methods of General Semantics, we have no direct neurological means to alter this distribution, hence a general, and at present unnecessary, animalistic or infantile stage of human development.

in structure to the world, ourselves included, and all speculations in such a language must only lead us astray and prevent adjustment. Thus empirically 'space' and 'time', 'body' and 'mind', 'emotions' and 'intellect', etc., cannot be separated, yet they can be split verbally. Such an elementalistic language must lead us dangerously astray, making the solution of human problems impossible. Einstein-Minkowski established in their space-time a language of similar structure (non-split, non-elementalistic), and the consequences gave us new constructive orientations. General Semantics also introduces a non-elementalistic extensional language similar in structure to the facts, and new constructive consequences, new semantic reactions, new orientations, new attitudes, new evaluations, etc., also follow automatically.

2) The problems of this coveted 'similarity of structure' go much farther and involve the most important problems of 'intension' and 'extension', strictly connected with order, (p.13, 93, 94, 135, 141, 152, 170 ff, 175, 179, 182, 208, 219, 256, 351, 455, 532, 539, 711, 734, 746). For instance, an intensional definition of 'man' might be a 'featherless biped'. Such a definition would be quite true, applicable to 'all' men, yet extensionally would cover none, would be quite useless, and in practice dangerous because it would lead only to identifications of different individuals into one verbal fiction. Similarly a term like 'yes', or any other multiordinal term (pp.435-442), may be defined by intension as 'signifying agreement'. Here we see the lack of similarity in linguistic structure to the empirical world. Thus linguistically in intension we have one 'man', one 'yes', etc., while in life we deal with an indefinite number of different individuals or many extensional 'yes's. An extensional definition of man would be: 'a collection which contains Smith₁, Smith₂, Smith₃, etc.,' where individuals are taken into account and represented.

The extensional content of 'yes' of course depends uniquely on the context. Thus if one is asked 'do you want to smoke' or 'do you want to drink', and we say 'yes', in the first case the content becomes smoking, in the second drinking, and we have two distinct extensional 'yes's and 'yes's', quite different issues in life. The extensional method leads to the necessary multiordinality of such terms as: 'yes', 'no', 'true', 'false', 'fact', 'reality', 'hate', 'love', 'doubt', etc., etc., and in general such terms which can be applied to any order of abstractions. Multiordinal terms in the meantime represent the most important words in our vocabulary. These have no general extensional meaning but their content is exclusively given by the given context. The realization of the extensional multiordinality of such terms, eliminates an endless array of misunderstandings, quarrels and finally human maladjustments, because we are using a language similar in structure to the facts of life.

At present human orientations are thoroughly intensional, and so we orient ourselves mostly by verbal fictions. Mathematics and at present General Semantics are extensional, which automatically involves corresponding elementary changes in the structure of languages, orientations, attitudes, etc. I must emphasize once more the simplicity of extensional training, and that all neuro-linguistic and neuro-semantic issues are automatically interconnected. By simple neuro-linguistic extensional devices which work automatically, we can bring about neuro-semantic adjustment toward, in principle, general sanity.

In psychotherapy a successful physician accidentally does something of this extensional sort but for general sanity and prevention, a general neuro-linguistic extensional method must be formulated, so that parents, teachers, and psychiatrists could be acquainted and could deal with these entirely general neuro-linguistic mechanisms. That the older psychotherapy is so difficult and laborious, and the immediate beneficial results so often do not last, is probably due to the fact that these general neuro-linguistic problems have been neglected and the slightly and accidentally exten-

sionally rebuilt individual is thrown back into a thoroughly intensional world, which brings about some more injury. An extensionalized individual becomes by internal necessity immune to 'psychic trauma', and so even the results of psychotherapy could probably be made more lasting.

The issues are presented here with too much sharpness. It would take much more writing to present them more exactly, but one difference between intension and extension, as found in actual life (judged already by extensional attitudes) as against the older intensional textbooks, must be emphasized. 'Pure' extension is probably impossible and it must involve intension, the only difference being in our main type of orientations, whether we have predominantly extensional or intensional orientations and languages. 'Pure' intension however, probably does exist, but such cases are usually found in hospitals for 'mentally' ill, among some 'philosophers' of the older verbalistic schools, and some mathematicians when they deal with human problems and use the old intensional elementalistic languages.

Thus through an extremely simple neuro-linguistic extensional training or retraining, which works automatically, we are finally enabled to alter beneficially neuro-semantic reactions, orientations, character, capacities, etc. These potentialities do exist in the human nervous system, yet they are seldom evoked because our older intensional neuro-linguistic trainings were neurologically harmful. The theoretical undoing of age-old harmful neuro-linguistic intensional effects is not simple, but the practical applications are childlike and work automatically without any theoretical discussions.

An example may illustrate the difference between intensional and extensional attitudes and languages. A professional and sympathetic correspondent dislikes the use made by the writer of the term 'copy'. He writes:

'Please: does my stomach "COPY" animals?'

Does my nervous system "COPY" animals?'

'If you say "yes" then I must say it does not make sense to me'.

The writer's answer was: 'Do not play on the old intensional language, observe the facts of life first and afterwards adjust an extensional language to the facts. In the extensional language the content of the first 'copy' (let us call it 'copy₁') is the 'stomach'; in the second 'copy' ('copy₂') the content is the 'nervous system'. By observation of facts we conclude: 'It would be very desirable if humans could 'copy₁' animals in their stomach reactions, as this would eliminate many human nervous stomach troubles, but unfortunately this is impossible with the human more complex nervous system. Yet unfortunately humans can 'copy₂' animals in their nervous reactions, as explained in Footnote (5)'.

The intensional difficulty and the question, formulated in an extensional language, become impossible.

Thus: 'Please, does my stomach COPY₁ animals?' (No).

Does my nervous system COPY₂ animals?' (Yes).

makes obvious the use of two different words 'copy₁' and 'copy₂', with two different extensional contents, eliminates the difficulty due to mere verbal identifications, and compels the investigation of facts. This method is entirely general, and applicable to all difficulties of science and life.

Signal- vs. Symbol-reactions

The fundamental difference between signal-reactions and symbol-reactions and mech-

anism becomes the more important when we realize that with animals, without human interference, the organismal results of a stimulus may last for some limited time (W. B. Cannon), with survival value; which would become harmful, toxic, etc., to the animal if the organismal results would last indefinitely, as is often the case with humans. For these reasons, it must be harmful to humans, if we train them in signal-reactions of low degree of conditionality, since humans with their nervous system and increased stimulations may retain the more numerous excitations indefinitely, and this may lead to harmful results. The only way to abolish or prevent the harmful results, is to train or re-train humans in symbol-reactions of full conditionality, which abolish the persistence of organismal effects of an excitation, which being no longer necessary, may become harmful.

To what extent these issues are disregarded in science and education, I may best illustrate by quoting from the very important work of W. B. Cannon: Bodily Changes in Pain, Hunger, Fear, and Rage, p.185.

'The most significant feature of these bodily reactions in pain and in presence of emotion-provoking objects is that they are of the nature of reflexes - they are not willed movements, indeed they are often distressingly beyond the control of the will. The pattern of the reaction, in these as in other reflexes, is deeply inwrought in the workings of the nervous system, and when the appropriate occasion arises, typical organic responses are evoked through inherent automaticism'.

This is true about animals, 'mentally' ill, and defectives, etc., but not true for humans as such, although we may train them in animalistic reactions with very telling results, whereas we could train them as easily in human reactions. Here we encounter one of those momentous occasions when we misevaluate statistical data, and when present-day exceptions formulate the rule; namely, that, in at present isolated occasions, most of human reactions may be under volitional control. Any positive observation must be accepted at its face value, and not discarded because it is unusual. For instance the writer knows a man who can volitionally control his heart beats, as established by the cardiograph. In the writer's own case, the war experiences have left certain automatic (animalistic) thalamic signal-reactions, which in connection with war memories, he, as a rule, is unable to control. Once, however, in a psychogalvanic experiment, when the writer deliberately tested this animalistic signal-reaction, for the first time it did not appear. In other words the animalistic automatic signal-reaction was under human control as it should be, and so became a symbol-reaction, which having lost its meaning, did not appear. For humans, such isolated cases of control, are of the utmost significance as they establish the existence of corresponding sub-microscopic mechanisms, although at the present stage of human development we do not know how to make use of them. So we see that in humans this automaticism is not 'inherent', but produced by training in animalistic reactions of low conditionality, which we believe to be 'inherent' and we teach such fallacies in homes, schools and universities. These fallacies are produced by disregarding sub-microscopic differences as revealed by function, and hastily generalizing from macroscopic similarities.

At this pioneering stage of General Semantics it is impossible to foresee whether all human reactions can be made of full conditionality. However, as yet isolated empirical data show that the majority of them can be controlled by the human nervous system volitionally, which indicates clearly the existence of human nervous mechanisms, fundamentally different from animal mechanisms. Of course these differences must exist on microscopic and sub-microscopic levels. It is entirely misleading and disastrous to depend on statistics of a misused mechanism and generalize on this base. The only way out is to eliminate completely the misuse and then see what happens.

On Some Nervous Mechanisms

The fundamental neurological mechanism of 'Bahnung', or the 'law of facilitation', or 'canalization', by which, when a nervous impulse has passed once through a certain set of neurones to the exclusion of others, it will tend to take the same course on future occasions, should never be disregarded. When we recall further the well known physiological fact that a nervous circuit in action is prepotent over resting circuits, and when a response is in the process, inter-current stimuli tend to affect the acting circuit rather than to activate resting neurones, we will understand the main mechanisms of physiological habits, learning, training, inherent or acquired automatisms, etc.

The psychotherapeutic clinical records indicate that in most of curable 'mental' and nervous 'functional' disorders (excluding organic, toxic, etc., diseases) a causal factor can be discovered, usually called 'psychic trauma' or a neuro-semantic injury produced for instance by some psycho-logical pain, fear, hurts, etc. All science ultimately depends on a causal analysis, and in medicine a causal discovery always means the possibility of therapy and prevention. These medical problems are extremely complex and involve a great many determinants. As General Semantics is not a medical science, but an auxiliary yet necessary science for physicians and educators, it may be pointed out only that the neuro-semantic injury depends to a large extent on the psycho-logical states which the given events acted upon. General Semantics through further causal extensional investigations discloses some general neuro-semantic mechanisms of these 'psycho-logical states' which automatically manufacture the injury or make a given person immune to such injury. It turns out that by proper neuro-semantic extensional education a 'psychic trauma' is made in principle (if not in all actual cases) impossible. Of course in actual cases enormous complexities arise, which do not alter the situation, that these mechanisms are entirely general, and at present practically universally abused, preparing a neuro-semantic background which facilitates such injury. The discovery of these connections in the causal chain offers great educational extensional preventive possibilities. There is a great need of further investigation of these connections, this time by physicians who are familiar with General Semantics, as this work will require professional medical knowledge and is outside of the field of Semantics.

It is not generally recognized to what extent special nervous training plays an organismal role even among animals. With humans, with their much more developed neuro-semantic and neuro-linguistic mechanisms and the impossibility of avoiding some training, the effect must be much more marked. Harrett (quoted by Rosett) (7) operated on the parathyroids of a number of rats. Ninety were of the standard wild stock while ninety-six were laboratory animals accustomed to being handled by humans. The results of the operations were quite unexpected: 79 percent of the wild rats rapidly developed tetany and died; 87 percent of the tame rats survived. It appears that a certain amount of nervous training was instrumental in overcoming a serious organic injury. It is true that Donaldson and Sugita have found that the brains of the wild rats are comparatively heavier relative to body weight, and of average greater thickness of the cortex. Rosett concludes: 'I showed the manner in which tetanic state, when superimposed on other neuromuscular abnormalities, exaggerates enormously their manifestations. If, therefore, an animal that must surely die of tetany is saved by a previous mental and muscular training of a certain kind, it can be only because that state is so common under natural conditions that the animal organism is by nature armed with potentialities for overcoming it. That these potentialities may be enormously developed by train-

(7) The Epileptic Seizure, Its Relation to Normal Thought and Normal Action, by Joshua Rosett, Arch. of Neurol. and Psychiatry. April, 1929.

ing will be seen from the experiments on epileptics cited later in this paper The hope of counteracting the evils sketched in the preceding pages lies largely in the recognition of these potentialities in the human being by the educator and the administrator.'

The experiments of Rosett on a large number of epileptics consisted in ordinal training (drill) of reactions. For details the original paper should be consulted, and here only one typical example must suffice. The epileptic patients were trained to synchronize different bodily actions and reactions with the beats of a metronome. An epileptic girl patient appeared a hopeless idiot. Her posture was stooping, the head hanging forward. The mouth was open and saliva dribbled. Her speech was incomprehensible and usually she refused to speak at all, etc. Such ordinal daily trainings were continued for a year. At the end of this period her stature was erect, her mouth was closed and no saliva dribbled, her speech became intelligible. She learned to read and write with a satisfactory degree of clearness and fluency. Her movements were nearly normal, etc. In all cases of similar ordinal training, 'the uniform report of the parents or guardians was that there took place a decided change in the patient's intellect and character. They became more tractable, less impulsive and capricious and less given to ungovernable outbursts of temper, and they exhibited a greater inclination for intellectual pursuits, such as reading, for which most of these patients have a decided aversion'.

General Semantics is based on ordinal extensional training of human semantic reactions with the aid of the Structural Differential (Chapter XXIX). The more detailed neurological mechanisms involved will be described later on.

Identifications as Primitive Neuro-signal Mechanisms

A comparative study of old and new data of the differences of animal and human reactions supplies the evidence as to the crucial neuro-semantic role 'identification' plays in life. This term is commonly used in several meanings. The main dictionary meaning is the most important as it expresses the historical, current, common, and often unconscious, and so uncritical, orientations of the great masses of humankind. The psychiatric meaning has not been clearly defined or analysed, and the term is often used to indicate a supposedly 'healthy' reaction, and at other times a pathological reaction, introducing great confusion in terminology. The meaning of 'identity' in 'philosophy', 'logic' and even in mathematics, strangely enough, is often utilized in a self-contradictory way of an 'identity' which is not 'identity', completely disregarding its relation to living human reactions and evaluations. It is necessary to stress here, that it is an unreasonable practice and harmful to mankind, if specialists utilize a common term which implies humanly undesirable orientations, and make out of it a technical term, even if with a special meaning. Such unreasonable practices only introduce difficulties in human orientations, make the understanding of scientific issues difficult to the layman, and worst of all, this only facilitates harmful orientations. Among others, General Semantics suggests that particularly specialists should be more careful in their choice of common words for their technical terminology, because a technical definition will not alter the folk-meaning, and corresponding living human neuro-semantic reactions. In General Semantics the folk-meaning can no longer be neglected.

'Identity' as a 'principle', is defined as 'absolute sameness in "all" ("every") respects'. If we use language correctly, as it is essential to do when fundamental issues are involved, the terms 'absolute' and 'all respects', make identity impossible, never to be empirically found in this world of processes, nor in our heads. 'Partial identity' or 'identity in some respects' obviously represents only a self-contradiction in terms, which should be eliminated from any sound orientation. 'Identification', as

a neuro-semantic process, is defined as 'the treatment (evaluation) of something as if agreeing in "all" (every) respects with something else'. Obviously such common intensional 'treatment' or orientation introduces only delusional, often unconscious factors into human general orientations and must lead to improper evaluation.

Identification originated very low in the scale of animal life. On animal levels it was the first neuro-signalic, organism-as-a-whole (non-elementalistic) manifestation of limited animal 'signal-intelligence', the first organic and/or organismal relating of 'cause' and 'effect', order, etc., when animal organisms responded effectively to signals 'as if' to actualities. On animal levels such organismal identifications have survival value, because under natural conditions, the animal must respond not only to stimuli which bring immediate benefit or harm, but also to certain other stimuli, if they happen to be causally connected with experience, which signalize the approach of the beneficial or harmful events.

The term 'identification' as used here is indispensable for an organism-as-a-whole or non-elementalistic extensional treatment, because it eliminates once and for all the anthropomorphic implications and intensional linguistic confusions. In a non-elementalistic treatment of life phenomena, life, neuro-muscular reactions, organismal identifications, signal-reactions (animal 'intelligence' of different degrees), and colloid-quantum behaviour are inseparably united and we split them only verbally and perhaps in laboratories under artificial conditions.

A classical example of identifications which perform the survival role of 'signal intelligence', can be found even in the lives of the amoebae. Amoebae represent bits of organically undifferentiated living protoplasm without any structuralized organs, but which, if stimulated by food, produce a temporal food-cup around the prey, close over it and pass the food into the interior of their body to a temporary 'stomach', where the food is digested. Amoebae and similar forms of life feed on stationary as well as motile prey. In the first case the stimulus is chemical as some of the prey give off oxygen or carbon dioxide; in the second, the vibrations set up in the water act as stimuli. Some writers anthropomorphize these reactions and even stress that the reactions are not to the stimulus per se, but to its 'significance', 'meaning', etc. Experiments however show that this is not the case, because the amoeba will exhibit similar reactions to artificial stimulations without food-value. Thus the amoeba as a living bit of protoplasm has organismally identified an artificial, valueless as food, laboratory stimulus with 'reality'. Thus although the reaction was there, the evaluation was improper, which does not change the biological fact that without such identifications, or automatic response to a stimulus, no amoeba could survive.

It cannot be overemphasized, that in an organism-as-a-whole treatment, life, neuro-muscular potentialities, and identifications, or some 'signal-intelligence' are inseparably united. Advancing in the scale of life the identifications become fewer, more flexible, 'proper evaluation' increases, and the animals become more and more 'intelligent', etc. If identifications are found in humans, these represent only a survival of primitive reactions, misvaluation, or a case of underdevelopment or regression, pathological for humans. Thus 'intelligence' becomes a concomitant of life itself, a necessary consequence of the inherent characteristic of living protoplasm, which means no more than the adjustment to the changing-in-complexity-environment, which the inherent irritability of the protoplasm must conquer or perish.

As in actual life (not only laboratories), excluding man, the environment plays a fatalistic role beyond animal control. In most cases, it becomes understandable why the impact of the environment must kill or produce 'adjustment', or rather some forms of 'intelligence' or 'signal-reactions'. With humans the impact of the environment is

radically different, because humans can fundamentally alter their environment; in some instances improve it, and partially help biological adjustment, in others build up such conditions of human life where higher order 'adjustment' or sanity become impossible, as we witness at present. Thus humans may sometimes survive 'physically' under artificial conditions where animals would perish, and so stop the propagation of the 'unfit'; and yet perish semantically and ultimately produce an un-sane race, through a lack of higher types of adjustment. On the human complex level, with their nervous complexities, an intensional un-sane or 'insane' human world will not survive.

Further examples can be taken from the famous experiments of Pavlov who trained his dogs to relate, say, the ringing of a bell with food, followed by glandular secretions in response to the signal, 'as if' to the actual food. It is obvious that here we deal with an organismal identification of the signal with actualities. Such animal organismal identifications allow the animals to adjust themselves to more complex conditions of life but their 'signal-intelligence' is thereby limited to the adjustment to the comparatively simple and rigid conditions of their life. By introducing man-made artificial complexities into these relatively simple signal-reactions, Pavlov succeeded in producing, at will, serious and even lasting disturbances in the functioning of the nervous systems of his dogs, corresponding to human neurosis or even psychosis.

In humans the number and variety of animalistic identifications is at present enormous; of every imaginable degree of intensity, ranging from the reactions of the 'mentally' ill, 'mentally' defective, the primitives, etc., to most of the difficulties in daily life and even science and mathematics. A few examples must suffice here.

Thus a 'mental' patient of Prince who was subject to hay fever when exposed to roses, was once unexpectedly shown paper roses and developed a severe attack, with all the 'sensory', motor, vaso-motor and secretory symptoms of hay fever (8). The patient organismally identified the sight, or one of the appearances ('sensa'-signal), with the physico-chemical effect of actual roses, followed by unnecessary and unpleasant consequences. Similarly some street concert players looking at boys who chew lemons in front of them, develop so much saliva that they are unable to play. They too have organismally identified the sight with actualities, as animals, 'mentally' ill, etc., do. In some such cases, if the playing of the cornet was necessary, say, to convey some important message at a distance, such animalistic identifications in humans could eventually bring disaster. So we see that in some such cases the animalistic signal-mechanisms did work, but their human symbol-mechanisms were at fault because the evaluation was improper. Therefore in humans, animalistic identifications not only have no survival value, but indeed, may have disastrous consequences.

The last example may appear somewhat far-fetched, although even ordinary blushing, which humans should have under conscious control, is an example of organismal identifications; a satisfactory analysis of more serious and harmful identifications requires a great deal of writing space, which cannot be spared here. It is not really important to elaborate on details, when we deal with fundamental issues only, because the interested reader who grasps the fundamental difference between animal and human nervous reactions, can easily observe endless serious identifications, with most complex consequences in life; and the casual reader will miss the principle and so will not benefit by any more elaborate exemplification. It is of importance however, as in all psychotherapy, to discover the exact mechanism of some general human difficulties, so that anyone could be taught how to meet his own difficulties in the most efficient way. Psychotherapy deals with difficulties which it took an individual a life-time to pro-

(8) Reported by Prince and quoted by W. A. White in his Outlines of Psychiatry, pg. 15 (1921)

duce. General Semantics deals with a general human racial difficulty, which it took many millions of years of evolution to produce, and this cannot be solved in a few hours, nor even weeks.

Some such organismal identifications of appearances, symbols (evaluated organismally as signals), desires, wishes, fears, and other neuro-semantic states with supposed actualities, etc., of course affect human proper evaluations, unconscious orientations, and behaviour. These identifications are found in all known primitive peoples, in all known forms of 'mentally' ill, in 'mentally' defective, etc., and underlie present human neuro-semantic difficulties in all known fields, sciences and mathematics included. Intensional orientations and languages automatically lead to, and facilitate identifications.

The interested reader will find in anthropological and psychiatric literature endless examples, which in a milder form he will discover in his own and others' daily lives and in public affairs (9).

Primitive Identifications in Science

In science the main achievement of Einstein-Minkowski was to eliminate some identifications from physics, which resulted not only in a constructive extensional non-elementalistic scientific evolution but also, by the elimination of an intensional 'absolute' and other pathological factors, produced an ever-growing list of nervously non-blocked young creative scientific geniuses. (p.783-798).

In mathematics we still witness the scandal that the mathematical world is hopelessly divided into two hostile camps about mathematical 'infinity'. Some 'believe' in 'infinite' numbers (roughly), some do not, and they often mutually get as ugly about it as any two religionists would. The difficulty is solved by the realization that mathematicians, in their arguments, use one intensional elementalistic term 'concept' for two extensionally entirely different issues, which conceals and so helps a vicious identification of the psycho-logical process of generating number, a process which by definition is 'infinite', as every number has a successor, with the result called number, which in each instance must be finite (10).

The above also suggests how elementalistic intensional terminology helps identifications and the use of the human symbol-mechanisms (which should involve proper extensional human evaluation, etc.,) as uncritical and habitual reflex signal-mechanisms.

Indeed Bleuler in his Textbook of Psychiatry, in the Chapter on 'General Psychopathology', p.70, states clearly: 'In more difficult matters such confusions of ideas may be encountered even in the most intelligent class; the frequent confusions in the deductive sciences are mostly due to the fact that two somewhat differing concepts are connected by a common designation and are then interchanged.' Such intensional 'confusions' obviously represent a signal-reaction where two extensionally distinct meanings are identified into one, and so improper evaluation results.

In natural sciences and in medicine, we mostly identify the simpler animal reactions with the much more complex human reactions. We identify also, through vicious

(9) Consult for instance Primitive Mentality and How Natives Think, by L. Levy Bruhl; the books of B. Malinowski (p.775); and The Primitive Archaisic Forms of Inner Experience and Thought in Schizophrenia, by A. Storch (Wash., D. C.).

(10) The literature is extensive; consult Chapter XIV, and Consistency in Mathematics, by H. Weyl (Rice Institute).

intensional terminology and the use of one term, the neurological 'inhibition' with psycho-logical inhibitions, which are extensionally entirely different. The term 'inhibition' represents a legal and ecclesiastical term, very harmful in neurology, and this is why I use it in quotation marks. The proof of such a scandalous state of affairs is found in the report of the National Committee for Mental Hygiene; 'Psychiatry in Medical Education' (25 cents), in which it is stressed that no general physician can render a maximum service to the community if he is ignorant of psychiatry, which 'should permeate the whole education and practice of the physician'. In fact human nervous reactions extensionally radically differ from animal nervous reactions in that humans can produce 'physical' symptoms of different ill by psycho-logical means, which animals without human interference cannot do. Hence also the serious harm of intensional animalistic theories for humans, and the intensional training of humans by 'education' to utilize their symbol-mechanisms as animal signal-mechanisms. Human symbol-mechanisms include as a particular limitation signal-mechanisms, but not vice-versa, and the main problem is in the neurological canalization, training, whether we train humans in human or animal reactions, because once the nervous functional patterns ('Bahnung') are established, it is very difficult to change them. The necessity therefore for discovering the fundamental difference between animal and human 'knowledge', 'intelligence', etc., becomes imperative; the more so, since the use of one intensional term for two extensionally different functions, one of which cannot produce science, mathematics and 'insanity', and the other can, leads only to the identification of the two different nervous functions, animal and human. Mere animal 'conditioning' in signal-reactions will not produce a sane human race. The report also stresses the need of the 'organism-as-a-whole' attitude (non-elementalistic), which is impossible to achieve if we do not pass from intensional to extensional orientations and languages, stop identifications and the use of elementalistic terms.

The neurological viciousness of identifications appears here extensionally quite clearly. The co-ordinating nervous mechanisms depend on a proper balance between nervous excitations and nervous 'inhibitions'. If the nervous system is over-excited, or nervous 'inhibition' is abolished through the action, for instance, of strychnine or the bacillus tetani, tetany or morbid tension occurs (11).

The present world is over-excited through increasing complexities, nervous balance is impaired, and to restore this balance neurological (not 'psychological') 'inhibition' is needed. Existing medical science, or intensional education is at present powerless to produce this most necessary neurological 'inhibition', which can be produced exclusively by extensional methods. 'Psychological' 'inhibitions', in the meantime, act mostly as conscious excitatory factors, and so aggravate only the neurological unbalance. This neurological situation, because of steadily increasing complexities in human lives, is literally hopeless; and is bound to become increasingly worse unless we discover workable, extensional educational means, of imparting to humans this most needed neurological 'inhibition'. General Semantics solves this neurological problem fully in its own field.

Direct Neuro-Semantic Methods of Training

The direct neurological mechanisms involved in semantic training are well known and very simple in practical utilization.

The cerebral cortex makes up about half the total weight of the human brain, and physiologically dominates and controls the activities of the organism-as-a-whole. The

(11) Consult any textbook on physiology but particularly Human Physiology, by Z. H. Starling, under 'tetanus' and 'mechanisms of co-ordination'.

human nervous systems differ from the animal nervous systems in many ways, impossible to list here. One difference, however, must be emphasized; namely, that the human child is born with a structurally unfinished nervous system and the growth, multiplication, etc., of neurons goes on for many years. This fact introduces great complexities and potentialities in human lives non-existent in the lives of animals, whose nervous systems mature much earlier. Thus the early training of an immature and nervously undeveloped child in (inappropriate intensional neuro-semantic and neuro-linguistic reactions, through the law of nervous facilitation tends, if not counter-acted, to produce a real neurological dilemma of preserving infantile reactions in adult life, and may become a serious source of maladjustments.

The cerebral cortex exerts a great many influences but, for our purposes, the differential dynamogenic influence, which manifests itself in control of the lower centres, inducing a delay in immediate reactions, in connection with neurological 'inhibition', is the most important (12). The terms underlined do not indicate separate, elementalistic, fictitious in isolation, functions, but only special descriptive intensional linguistic aspects of one extensional non-elementalistic process, which in a living organism cannot be divided. This non-elementalistic orientation suggests that, if we could introduce a delay in reactions, we would stimulate the differential dynamogenic influence of the cortex and introduce neurological 'inhibition', and so on, in a permutation. This functional interconnection of linguistic aspects of one non-verbal process-as-a-whole, suggests that we should select such an aspect of the whole process, which is technically amenable to training. Thus if we set for ourselves the goal to 'stimulate the differential dynamogenic influence', or stimulate 'neurological "inhibition" of the cortex, we would not have the slightest notion how to actually go about it. But we can produce new semantic methods by which the delay in immediate reactions can become an extensional educational method for neurological canalization, which would then automatically stimulate the other desirable aspects of this one indivisible process. The new methods should not only train in delayed reactions, but should be of the utmost simplicity and generality, so that they could be applied to anyone, under any circumstances. A thorough-going physiological and extensional attitude suggests the solution. Our reactions are extensionally ordered in space-time as a matter of fact. Thus before a Smith can react to an object, situation, word, etc., the object, situation, word, etc., must first exist as a stimulus. Reactions to non-existents, yet assumed as existents, etc., are called illusions, delusions, and hallucinations, and rightly considered pathological.

Theory and experiments verify the above.

The neurological mechanisms utilized by General Semantics, follow the above pattern. By the aid of the Structural Differential we extensionally order semantic reactions, and train in 'silence on the objective level' (which includes 'pain', 'pleasure' all immediate 'feelings', etc., in general immediate semantic reactions, which are not verbal), and this ordering introduces delay in reactions, and so automatically stimulates neurological 'inhibitions', and the 'differential dynamogenic influences', etc. The results are described by experimenters, and the extreme variety of the beneficial semantic results, with the simplicity of the extensional means employed, becomes only comprehensible if we cease to treat one process working as-a-whole, as if made up of actual different functions, just because this is suggested by the intensional structure of the language used (13).

(12) Consult An Introduction to Neurology; Neurological Foundations of Animal Behaviour; Breins of Rats and Men; by C. J. Herrick, under 'Cerebral Cortex' and 'Inhibition'. Chapter XIV: 'Summary of Cortical Evolution' in the last mentioned book is particularly important.

(13) Consult the index of Science and Sanity and particularly Part VII.

Other experiments also show the direct neurological value of space-time order and ordinal disciplines (14).

The Structural Differential is based on the semantic equivalence of non-identity and extensional ordering of the semantic reactions. Vice versa, animals, primitives, 'mentally' ill, etc., with their organismal identifications cannot order their reactions in the present sense. These issues are neurologically extremely sharp, and those who want to preserve at least some identifications will never be able to extensionally order their semantic reactions, and so acquire nervous balance. The world has to take its choice.

A nervously balanced animal, without human interference, has a nervous system so adjusted that it has a capacity for nervous 'inhibition' corresponding to the excitations in his simple life, its simplicity or complexity depending on the development of his nervous system. If humans 'copy animals in their nervous reactions' this implies a corresponding animal balance of nervous 'inhibitions' with animal excitations, which are fewer than in a human world, and so such humans cannot adjust themselves at their best to a complex human world. In simple words and roughly, humans through nervous canalization of the child do not utilize enough their cerebral cortex, the main role of which, by neurological necessity, must be brought into optimum action as a result of individual or racial experience (time-binding) which we call 'education'. Through inherent nervous mechanisms, it is humanly impossible to avoid some neuro-semantic and neuro-linguistic training and nervous canalization, which being neurological, shape our reactions automatically. Thus if our parents and educators themselves preserve primitive intensional neuro-linguistic and neuro-semantic canalizations and reactions, they perpetuate them neurologically in their children. Can this vicious circle be broken once and for all? Yes, if science discovers the neurological mechanisms of these reactions, then we would know how to handle them. At present neither neurology nor medicine, nor education has discovered direct neurological means by which these neurological inherent handicaps could be overcome, and yet they must be overcome, if a general grown-up infantilism, un-sanity, and other human tragedies are to be avoided.

The older indirect educational intensional methods were extremely laborious and usually ineffective. Experience shows that we were unable to enhance native capacities noticeably, and conversely we were able to hamper them considerably. The discovery of the connection between non-identifications, ordering of semantic reactions, extensionalizations, a delay of response, etc., made General Semantics possible and finally supplied the much needed means for direct neurological stimulation of the cortex, by a childlike extensional technique and drill, with all the most complex yet automatic beneficial consequences. Experience shows that this applies even to the most educated humans, supplying additional proofs to what extent the older medical and intensional educational languages and methods were ineffective and even involved harmful factors. What is however most unexpected is the enormous complexity of desirable psycho-logical results achieved with the extreme simplicity of extensional means employed, if, and only if, the neuro-semantic training or re-training or a new adult canalization is complete. 'Knowing about it' is not enough, and does not work; simple yet persistent training is needed, as in the case of learning to typewrite or drive an automobile.

It seems beyond dispute that any human theory about humans should conform with properly understood human nature, otherwise the theories will not work and human insti-

(14) Consult Conditioned Reflexes, an Investigation of the Physiological Activity of the Cerebral Cortex, by I. P. Pavlov, with the help of the index; and, for data on the semantic and neurological values of ordering human reactions, J. Rosett (note 7 above). The index of Science and Sanity should also be consulted because many data are given there impossible to repeat here.

tutions, after many unnecessary sufferings, will sporadically collapse. At present we have many elementalistic theories about so-called 'human nature', still based on animalistic identifications (and so reactions), but no scientific extensional theory, which would consider not only similarities but also the essential differences between human and animal nervous reactions, and would not utilize pathological statistics as 'normal'. Among others, General Semantics shows that, although human nature involves many factors, three of them are of paramount importance: 1) Environment-relational conditions, created by other intensional theories and creeds, and strictly connected with 2) the intensional structure of the habitual language used; and 3) the number of values in our orientations; all of which depend on the presence or elimination of animalistic identifications from human reactions. Psychotherapy in particular cases, and General Semantics in general, show beyond a doubt, that human nature can be changed constructively once we know how.

The main difficulty is that our present theories are still animalistic, based on injurious intensional languages, identifications, etc., and unless we submit our theories to a radical extensional linguistic and neuro-semantic revision, and eliminate these pathological factors from them, human problems cannot be solved successfully at all. It is downright futile to expect beneficial results from improperly used human nervous systems.

Identifications, Nervous Projection Mechanisms, and 'False Knowledge'

It is well known in psychiatry that neuro-physiological 'false knowledge' is often productive of 'mental' or nervous diseases. Here we will analyse some inherited neuro-physiological factors which, if not counteracted by elementary extensional education, introduce delusional factors of active 'false knowledge', twisting our whole orientation and tending to produce and preserve primitive animism, anthropomorphism, etc., - in reality a delusional world.

This delusional orientation results from the nervous projection mechanisms by which, for example, we see the 'red' of a rose 'there' (outside our skins), - whereas there is no 'red' there, but only electromagnetic processes of different wave-lengths which act only as a stimulus on our nervous system. So, what we call 'red' represents exclusively a nervous construct, a symbol inside our heads for something that is not 'colour', outside our heads - also leads to identifications of internal processes with external processes (actualities) 1935. This applies to all so-called 'sense perceptions'. These nervous general projection mechanisms have no doubt definite survival value for animals with their simpler reflex signal-mechanisms which limit their intelligence, field of activities, etc. However in humans who are not aware of these elementary neuro-physical structural facts, and the neuro-symbolic character of 'perception', it leads only to 'false knowledge', false evaluation, the identifications of internal processes with external 1935 actualities, only introduces delusional factors, and builds up a fictitious animistic and anthropomorphic world, entirely different from actualities 1935. The more highly developed human projection mechanisms aided by intensional method may produce morbid projections such as delusions, illusions, hallucinations, etc., or even hysterical false pregnancies, etc., hence a danger for humans. It becomes obvious also that because of the difference between the reactions of animal signal-mechanisms and human symbol-mechanisms elementary structural ignorance, or what is still worse, 'false knowledge' which represents an active and harmful factor in humans, must lead to identifications, disturbances in the projection mechanisms, etc., pathological for humans.

Animal and Human Mechanisms of Adaptation

'Signal-intelligence' can adapt the animals only to the simple conditions of their

life, rigidly established by survival. Even in animals, as has already been said, by introducing complexities into the interplay of the signal-mechanisms of his dogs, Pavlov at will could profoundly and often lastingly disturb the nervous functioning of these animals. Similarly, primitive races do not survive the contact with the complexities of so-called 'civilization'. Here we are facing a most serious issue. Shall mankind survive the steady and rapid advance of extensional sciences, which continuously introduces neuro-semantic complexities into our lives, while preserving the present intensional identifications, animalistic signal-orientations, etc.? The answer seems definite; namely, either we shall stop scientific advance, as it is understood today, or we must discover a means by which animalistic nervous signal-reactions in humans can be generally transformed into nervous symbol-reactions, as otherwise all the acquisitions of science will be of no value but a danger to a world made up of 'mentally' and nervously disordered.

Animalistic identifications have not only survival value for the animals, but make animals nervously well integrated for their simpler life. As living organisms, their actual activities are not split into elementalistic 'body' and 'mind', in spite of the intensional verbalistic splittings and elementalistic speculations which humans perpetrate upon them. Not so with humans, with their more highly developed nervous systems, which cannot be well integrated as long as we keep animalistic identifications, etc., on the one side, and on the other human functions, as artificially detached (elementalism); and so split language, split orientations, split sciences, split nations, split families, etc., make their appearance; laying the neurological foundations for split personalities, and a suicidal, un-sane, non-integrated 'civilization'. These difficulties are actually neurological, and cannot be remedied by other than neurological means. Hence the importance of extensional non-elementalistic neuro-semantic, neuro-linguistic researches, and the discovery of methodological neuro-educational means to help directly the integrative functions of the human nervous system. Traditionally 'causal analysis' (orientation) was supposed to be very 'intellectual' (elementalistic formulation), yet without technicalities of science, this cannot become a general working method for present mankind. Besides, 'causality' as a method has no direct neurological application. However, order, and so ordinal disciplines, are as a matter of fact neurological extensional counterparts of 'causality', on a different, this time, neuro-educational, non-elementalistic, general level. This is of crucial methodological importance because it transforms the 'philosophical', the 'intellectual', 'highbrow' non-workable in home and elementary education, etc., intensional methods; into childishly simple, entirely general in applicability even to idiots, etc., non-elementalistic directly neurological extensional ordinal, methods. It should be noticed that the non-elementalistic orientation-term 'order' applies to elementalistic divided 'senses' and 'mind', and so the term and the following orientations help to integrate the functions of the human nervous system, and will help the traditionally split personalities who discriminate sharply between 'senses' and 'mind', to bring these split fictions into a living inseparable partnership, profoundly affecting their general orientations and so reactions.

The 'ordering of reactions' depends on extensional method and the complete elimination of 'identifications', in other words on the imparting of modern infinite-valued, extensional scientific process orientations, these issues being semantically equivalent and verified in all fields of human endeavour.

The study of science, mathematics, and 'insanity' as unique forms of human nervous reactions shows that most of the constructive achievements in science and mathematics were made by extensional method and the elimination of some identifications somewhere. In psychotherapy we also find that what a successful physician does, is first to discover, and then to eliminate some inappropriate organismal evaluation somewhere, which

turns out ultimately to represent the elimination of some identification, use of some vague extensional methods, or else the transformation of some animalistic signal-reactions of a low degree of conditionality (compulsions of different degrees, etc.), into human symbol-reactions of full conditionality.

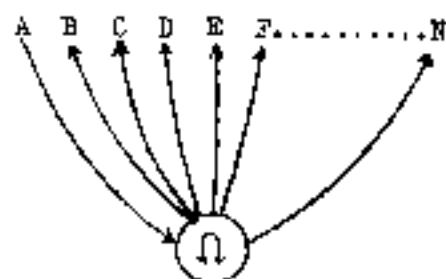
Some such analysis and emphasis becomes important because all available data from all fields of human interest point definitely in the direction, that intensional method and languages and even one identification, can ruin a human life, a science, or a social, etc., system. The finding in a given case of the crucial identification(s) is a laborious process but very effective. However, before this could be done a general extensional neuro-semantic theory of this subject had to be formulated.

Periods of Human Neuro-Semantic Development

Investigation shows that the process of development of lower animals into higher animals; higher animals into primitive peoples; primitive peoples into our present, semi-primitive or infantile stage of development; and perhaps finally into a full-grown adult, thence extensional scientific human civilization of the future, is strictly connected with the problems of the gradual outgrowing of literal, organismal animalistic identifications, or the increased conditionality of the conditional reactions. The gradual transformation of animalistic signal-reactions from a low degree of conditionality into human extensional symbol-reactions, which necessarily involves human 'meanings', 'proper evaluation', and other neuro-semantic factors of full conditionality, is completely achieved by 'consciousness of abstracting', which, by the new neuro-educational methods and the training with the Structural Differential in extensional methods, can be easily and almost generally imparted. A schematic diagram may make this clearer. (P.463; consult also the index: Abstracting, consciousness of,).

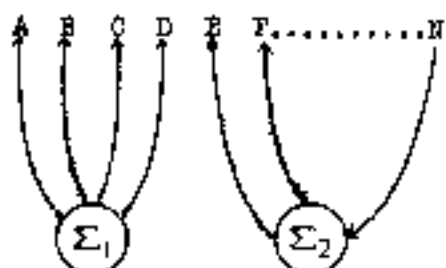
A,B,C, etc. Infinite-valued and different facts of extensional experience, which, in a given case, have, by necessity, indefinitely many, single, individual values.

Ω or one-valued, animal, primitive, etc., intensional orientations structurally non-similar to the empirical world, which compel us to ascribe one intensional value to the essentially indefinitely many-valued and different facts, resulting in identification of many values into one, such improper evaluation being projected on the facts. Beginning of the 'magic of words'.



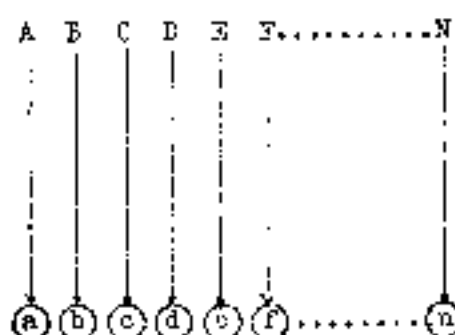
A,B,C, etc. Infinite-valued and different facts of extensional experience, which, in a given case, have, by necessity, indefinitely many, single, individual values.

Σ_1, Σ_2 , etc., two-, three-, etc., and few-valued present aristotelian intensional orientations structurally non-similar to the empirical world, which compel us to ascribe two, etc., or few intensional values to the essentially indefinitely many-valued and different facts, resulting in identification of the many values into a few, such improper evaluation being projected on the facts. The 'magic of words' still persists.



A,B,C, etc. Infinite-valued and different facts of extensional experience, which, in a given case, have, by necessity, indefinitely many, single, individual values.

a,b,c, etc. Infinite-valued non-aristotelian extensional orientations structurally similar to the empirical world, which allow us, in a given case, to assign indefinitely many single, one-to-one corresponding values to the individual facts and so lead to proper extensional evaluation, freed from identification, and so to adjustment and sanity. The elimination of the 'magic of words'.



It should be understood that modern 1935 science necessitates a general infinite-valued extensional orientation which requires a complete elimination of unconscious identifications. The imparting of this orientation allows, however, the use of a conscious two-valued technique (not orientation) wherever we need particular sharpness, as for instance in mathematics, where always $1 + 1 = 2$, although in life a gallon of water when added to a gallon of alcohol gives less than two gallons of the mixture; and sometimes Smithy 'plus' Smithy = six Smiths. Thus 'orientations', as organismal neuro-semantic reactions, should never be identified with a conscious technique. Thus we should be permanently extensionally conscious that nothing is ever identical with anything else, which seems to be as fundamental and universal a 'law of nature' as 'gravitation'; yet for practical purposes, say, one match may be equivalent to another match, or a number 2 is equal to number 2, in spite of the fact that the condition, 'in all respects', would include the differences of paper, ink, etc., even on this page, or in our nervous systems at different dates, and so make the two numbers non-identical, although equal.

It should be realized that these issues are of crucial importance and can no longer be neglected, because non-identification is semantically equivalent to extensional orientation, and to ordering of the reactions, which alone can directly affect the nervous mechanisms, as explained before. Thus any remainder of intensional orientations leads to identifications in human orientations, prevents an infinite-valued extensional orientation, and so the disregard of these clean-cut issues means the difference between success and failure, in general adjustment. There is however a special semantic difficulty involved in the transition, which has already appeared at least twice in the history of human orientations; namely, the passing from less general to the more general systems, which always marks a higher stage of human development. The first instance appeared in mathematics; namely, in the non-euclidean systems which are more general and include the euclidean system as a particular case. The second instance, in physics, the non-newtonian system includes the newtonian system as a particular or limiting case. In the present instance, the two-valued intensional aristotelian orientations represent only a particular case of the more general infinite-valued extensional non-aristotelian orientations. The special semantic transition-difficulty consists in that the passing from the older special cases to the more general non-systems, although extremely useful, yet requires special training. But once the more general orientation is acquired, we have, as history shows, no difficulties in fully understanding the more narrow special cases. This important fact among others explains why with the broader orientations we fully understand the other fellows' limitations, then many inside and outside irritants disappear and better adjustment follows. (P.96-98). This also explains some of the neuro-semantic mechanisms which were at work in the better-adjustment, etc., - experiments already quoted.

These problems of greater generality are of crucial importance in the development

of mankind, as is easily verified. For instance a savage may recognize the difference between an 'oak' and a 'pine', recognize similarities between different 'oaks'; he may be able to count up to 2, 3, and perhaps a few more, but he is incapable of the more general orientation such as a 'tree' or a 'number'. This also applies to idiots, imbeciles, etc., who are incapable of higher abstractions, and accounts for their very limitations, inefficiency of orientations, improper evaluations, and ultimately inability for independent personal and social adjustment. The older educational methods had no direct and efficient means to overcome these neuro-semantic handicaps. In fact, without realizing the gravity of the problems, parents and teachers 'saw the wind' and mankind 'reaps the whirlwind'. General Semantics offers definite neurological and direct extensional methods in terms of order, etc., of overcoming these difficulties, with all following beneficial consequences. We are dealing with one neuro-semantic process as-a-whole, which can be approached from many indivisible-in-life aspects, and only verbally divided. Order represents a non-elementalistic aspect and in extensional training connects the older split elementalistic 'senses' and 'mind', non-existent in isolation, hence its neuro-semantic non-elementalistic workability.

No one can doubt the great developments in mathematics and physics, but to the author it seems that the non-elementalistic extensional treatment of neuro-muscular-selective behaviour of living protoplasm, as so many verbal aspects of one living invisible process, based on the organismal process of identification, as the beginning of 'animal intelligence'; represents a large departure from the older orientations and language and offers promises for human advancement comparable to the advances in exact science. (P.371-431).

The above schematic summary is over-simplified and over-sharp, because in actual life issues overlap in an enormous variety of ways; besides, any new era of human development has always had forerunners who were 'ahead of their time', seldom fared well, and in a prevalent orientation, they had an orientation of the next period. In spite of this it is important, because in a given case one single neuro-semantic identification can produce so much improper evaluation, neuro-semantic blockages, and harm.

The situation is even more complex than that, as one individual may have different unconscious orientations on different occasions. In modern times one may observe some prominent scientists who exhibit an infinite-valued orientation at their desks or laboratories, which they shed with their office coats or aprons; who exhibit two-valued, or few-valued orientations at home or when they judge too harshly their fellow-men, victims of the older orientations; and exhibit an unconscious one-valued orientation in the fields of 'human nature', politics, sociology, economics, religion, and what not. As a rule the degree of splitting in persons, who in one skin enclose several unconscious neuro-semantic orientations, depends on the number and intensity of intentional identifications they still preserve.

Here appears a fundamental difference between the eras of human development, which should not be identified. The passing from the primitive to the semi-primitive, present aristotelian intensional era, was a very slow and gradual process of what may be called 'organismal evolution', and was not based on definite scientific discoveries. The passage from a two-, or few-valued, aristotelian to the infinite-valued extensional non-aristotelian era is the result of definite scientific discoveries, and so this process may become very rapid, because it depends only on the elimination from education at home, schools, and universities of animalistic and humanly pathological intensional factors, strictly connected with the proper use of the human neuro-semantic and neuro-linguistic mechanisms. This could be accomplished in a few years, under proper executive and administrative conditions, if educators, scientists, mathematicians, psychiatrists, and the intelligent public opinion, aided by the press, would co-operate. The

co-operation is essential, because although a few months of peristent neuro-linguistic extensional training (or self-training) are usually sufficient for the average adult, yet the majority are at present so nervously disturbed, worried, without security or confidence, etc., aggravated daily by a more and more bitter struggle for existence, increasing complexities of life, and increasingly alarming news items, etc., that their over-stimulated nervous systems either break down or have difficulties in making further efforts; not realizing that without special extensional efforts toward individual sanity, group, or national, or international sanity is impossible.

The present semantic situation finds itself in a vicious circle. The nervous disturbances block efforts to acquire neuro-semantic balance; and without such efforts this balance cannot be acquired. The personal disturbances are naturally reflected in national and international affairs, and will not be eliminated under the steadily growing complexities, until the spell of this vicious circle is broken by authoritative and concerted action.

Fundamental Scientific Structural Discoveries of Semantic Import

The causal scientific discoveries which necessitate a general, infinite-valued extensional, neuro-linguistic and neuro-semantic revision are many. Here only the crucial ones can be mentioned:

- 1) The latest findings of neuro-physiology (12), (14).
- 2) The discovery that 'static', 'permanent', 'substance with "external" properties', 'object', and all 'sense' data are external fictions, nervous constructs, symbols, manufactured by our internal nervous processes and only projected on the outside world. The belief (false knowledge based on ignorance) in the external 'reality' of such nervous constructs or symbols, makes it a delusional or humanly un-sane, or in some cases 'insane' human orientation (4).
- 3) The discovery of the dynamic, electronic, process, ever-changing structural character of 'matter' and 'object', in which the positive theories (structural assumptions) are of less importance than the negative results, showing that the older primitive theories are out of the question in 1935, is of crucial importance (4).
- 4) The Einstein-Minkowski non-elementalistic extensional theory in which it is shown that 'space' 'by itself' and 'time' 'by itself' are mere verbal elementalistic fictions, impossible in this world; and also the discovery of the equivalence of 'matter' and 'energy' (4).
- 5) The discovery of colloidal behaviour, and that all life represents forms of colloidal behaviour. (P. 111-123).
- 6) The findings of Pavlov about conditional reactions and the function of the nervous system (14). (P. 315-358).
- 7) The findings of neuro-psychiatry. (P. 491-526).
- 8) The discovery of the active character of the unconscious and its application to psychotherapy. (Freud). (Pp. 142, 491 ff., 501, 534, 536, 560, 771 f.).
- 9) The discoveries of Peano, Whitehead, Russell, Keynes, etc., in 'Mathematical Philosophy' and Mathematical Foundations.
- 10) The formulations of General Semantics represent in a way a parallel to the neurological work of Pavlov on animals. In General Semantics we study uniquely human neuro-semantic reactions, which produce mathematics, science, and 'insanity', and this results in the discovery of extensional methods for a direct stimulation of the differential dynamogenic functions of the cerebral cortex, direct introduction of neurological 'inhibition' etc., and also the discovery, that the neurological delay in reactions is equivalent to ordering of the neuro-semantic reactions, and equivalent to extensional non-identifications. All the listed advances of science are methodologically synthesized in General Semantics through a non-elementalistic extensional treat-

ment. Thus the older 'matter', 'object', etc., orientations represent only internal elementalistic 'sense' data, without external 'reality'. The modern dynamic process orientations are non-elementalistic because the data of modern physics represent a synthesis between 'senses' and 'mind', etc. (Part VII).

Even this over-simplified list of these pivotal scientific discoveries necessitates already a complete change in the numbers of values we have in our general neuro-semantic orientations and the passing from intensional to extensional orientations and languages. Thus the aristotelian 'object', 'substance', 'matter', 'with properties', etc., static orientations endowed these nervous constructs or symbols with definite 'internal' boundaries, and led to a two-valued 'object' orientation of: 'object 1 touches object 2 or does not'. In dialectics this was expressed as one of the canons of aristotelian 'logic', that 'A is B or not B'. Obviously in this aristotelian orientation, the static, 'object', 'matter', 'substance', etc., orientations were manufactured by the neuro-semantic and neuro-linguistic identification of many different stages of a dynamic process--which our elementalistic 'senses' do not register, without definite boundaries--into one delusional static, 'object', 'matter', 'substance', etc., with fictitious 'definite boundaries', etc., orientation. In other words, identifications of modern scientific infinite-valued different extensional stages of external, sub-microscopic processes produced a macroscopic 'object', 'substance', etc., which with its 'sense properties', has actual existence only inside our heads and is only projected outside our skins by our nervous system. This indicates clearly the need of a general infinite-valued extensional human orientation in connection with a general elimination of animalistic identifications on which depends the quite general delusional belief in the external 'reality' of 'sense perceptions'.

Similarly in natural sciences, the older, purely 'chemical', 'substance', as 'transported' in 'organs' or 'fibres', etc., as a general orientation, which may be handled by a few-valued 'sense-orientation', full of identifications and projections, is hopelessly antiquated and neuro-semantically harmful, accounts for very little, makes the living processes entirely incomprehensible; and only involves scientists and humanity in neuro-semantic blockages which any sort of fanciful metaphysics will not resolve. A modern colloids-quantum extensional orientation, where the 'travelling' is done by electrical and other currents, resulting in special colloids-quantum configurations which may act as special 'substances', (equivalence of 'matter' and 'energy'), necessitates an infinite-valued extensional physico-mathematical non-elementalistic process-orientation, and supplies indefinitely flexible physico-chemical dynamic structures which make the great variety of life and 'mind' manifestations comprehensible.

It is not a question of knowing 'all' details but of general orientations, which determine human attitudes toward the world and ourselves.

Observation shows that even most specialists who work in modern physics, modern colloids, etc., seldom have a thorough-going infinite-valued extensional process-orientation and continually relapse through mere nervous canalization into the few-valued 'objects', 'substance', 'fibre', etc., 'sense-orientations', involving identifications, etc. This greatly hampers their own work and accounts for the scarcity of creative scientists. The great majority of medical men, psychiatrists included, who preserve the few-valued orientations, are unable to utilize the modern structural colloids-quantum extensional process orientations, and become very metaphysical when they deal with so-called 'functional' diseases. There is no way out: either we orient ourselves extensionally, structurally in dynamic terms of sub-microscopic processes (new 'matter'), or our general orientations inevitably must remain intensional, metaphysical, animistic, animalistic, etc., and elementalistic.

Any student of General Semantics, if he observes extensionally the semantic reactions and processes of different specialists in vivo, or in their writings, cannot miss the serious discrepancy between the facts of modern science and the harmful neuro-semantic blocking effects of the older intensional identifications and the consequent few-valued orientations, even in the exact sciences.

General Semantics and Sociology, Economics, Politics, International Peace, etc.

Under such conditions, what cannot be said about the pseudo-sciences such as economics, sociology, etc., or such issues as 'world peace', 'sanity', etc.! In the older, even few-valued days, these were issues not considered as amenable to scientific treatment. If we eliminate from them identifications, - in other words - if the devotees of such disciplines or interests re-educate themselves to healthy extensional language and neuro-semantic reactions, and revise their theories; the older speculations, most of their statistics, etc., will turn out to be practically valueless and/or misleading. Obviously, statistics about primitive societies do not give us information about an aristotelian society; similarly, statistics from our present aristotelian society will not give any significant data for a future non-aristotelian human, and so 'sane' civilization.

The extensional analysis made by General Semantics reveals a very shocking state of affairs, and unless specialists revise and eliminate neuro-semantic identifications from their personal orientations and so disciplines, accept an extensional language and orientations, etc., there is no hope for a constructive and human 'civilization'. This is of more than 'Academic' interest, because in these days 'science' is a magic label, and the more honest and enlightened governments try to consult and follow the advices of different 'specialists', supposed 'scientists', who in the meantime know very little or nothing about modern science and extensional methods. It will be a calamity if, because of the vague label 'science' without a date, which may be antiquated, some harmful and un-scientific 1935 intensional speculations should be put into practice, as these are bound to be based on verbal fictions.

Neuro-semantic Hygiene as a World Educational Problem

In many respects the problems of sanity are similar to problems of preventive vaccination or general sanitation, for eliminating and preventing infectious diseases such as any 'plague', the control of which, with the increasing population and the advance in the means of communication and transportation, becomes steadily, internationally, more imperative.

With the still more increased over-crowding, and consequent complexities of living, combined with the latest scientific advances in the fields of communication and semantic 'transportation' such as newspapers and other publications, telegraphs, telephones, radios, etc., mass unbalance, affecting in at least one case a whole large nation, mass hysterics, panics, fears, and what not, are becoming increasingly a greater neuro-semantic menace than any 'plague' has been; hence the still more imperative need for a neuro-semantic sanitation and immunization.

Some further similarities can be listed:

- 1) The results are of national and international general human importance.
- 2) The positive preventive results are not obvious to the ignorant or 'thoughtless'.
- 3) One identification may be as dangerous as one germ is in infectious diseases, depending on the character of the injurious factor, etc.
- 4) Undesirable results, such as an outbreak of epidemics, become obvious as con-

cerus their origin and should not be blamed on 'human nature', but on un-sanitary conditions. Thus sporadic historical outbreaks such as wars, revolutions, persecutions, 'depressions', etc., have nothing to do with an unchangeable 'human nature', but have very much to do with humanly un-sanitary practices of 'copying animals in our nervous reactions'. Here different verbal intensional incantations will not help; but scientific 1935 neuro-semantic and neuro-linguistic extensional methods may.

5) Preventive and sanitary regulations are bothersome and often laborious.

6) Any institution of learning found to be spreading a disease would be closed and thoroughly disinfected. In the case of intension, identifications, etc., teachers should 'disinfect' their own reactions and stop animalistic educational practices, and the closing of the institutions would not be necessary.

7) Private and ignorant intensional opinions are not taken into account, but sanitary rules are enforced by authority. Any official or educator who violated them, would be discharged as unfit for his very responsible position.

8) The sanitary and preventive rules were elaborated by groups of different specialists after a theoretical and experimental investigation.

9) The preventive and sanitary problems are handled by executive and administrative authorities, because although their work is based on scientific findings, the scientists, as such, are not organized as a body for social action, yet the application of the scientific findings requires action.

10) The difficulties and delays in concerted action in prevention, sanitation, etc., are serious, and best illustrated by the history of small-pox vaccination. The discovery of vaccination was made by Doctor Edward Jenner of England. For many years he had heard of the country folk belief that those who had contracted cow-pox were immune to small-pox. From 1770 until 1796 he collected data. In 1796 he began actual experimenting, and in 1798 he published his results. The cause of 'anti-vaccination' had many followers among the physicians, priesthood and some laymen, continued even until today, and has had a marked effect in delaying the legislation for making vaccination compulsory. The first country to introduce compulsory vaccination was Bavaria in 1807; the second, Massachusetts, starting in 1809; followed by Denmark in 1810, Sweden 1814, some German States 1818, Prussia 1834, England 1853, German Empire 1874, Austria 1886, etc., and even today in some countries small-pox vaccination is not compulsory. The discrepancy between these dates is very instructive, and perhaps in the case of sanity and semantic hygiene such 'history will not repeat itself'.

In the case of general neuro-semantic and neuro-linguistic extensional sanitation there is another special difficulty in that we are dealing with nervous reaction-mechanisms which, as with a number of other human 'reflex'-reactions, can be inhibited volitionally and require complete relaxation before they will work properly. In humans not all ignorance is of a passive character. In the field of Semantics we usually deal with active 'false knowledge' of the intensional (definitional) 'know it all' character; entirely forgetful that we deal with the most complex problems in existence, which have as yet evaded a scientific extensional approach. This active 'false knowledge', often propagated by the structure of language and neuro-verbal intensional habits, is imposed unwittingly on every one of us from the cradle; and these may so twist the neuro-semantic mechanisms, that 'relaxation' is blocked and the beneficial results of an extensional retraining may be made difficult or impossible with some adults. 'False knowledge' introduces a serious neuro-semantic tension, which prevents the existing nervous mechanism from proper working. For these special neuro-physical human reasons, General Semantics must be investigated by a group of different specialists, the experimental results verified, and if found satisfactory, then extensional neuro-semantic conditions of sanity will have to be imposed on education by authority, as was done in the case of preventive vaccination. Most of the civilized states have proper agencies for the introduction of extensional methods for sanity; these are embodied in the governmental departments of education and public health, etc.

General Semantics is not a medical science, but an auxiliary experimental natural science, and a link between medical science, education, exact science, and daily life. It deals directly with an automatic neuro-semantic mechanism. The data on which General Semantics is based are well established and genuinely elementary: well known to any modern specialist in each field, but unknown to the others. As there is at present no specialist in this new field, then obviously only a group consisting of, say one modern specialist in each of the fields of anthropology, psychiatry, colloidal science, neuro-physiology, modern physics, mathematics, etc., and a scientifically trained educator, can pronounce an authoritative joint opinion, to be verified by experiments.

Conclusion

For technical and financial reasons the originator of General Semantics, as an individual, is unable to organize such a committee or group. It seems that governments, different foundations for 'promoting the well-being of mankind', 'to improve the "mental" and moral conditions of humanity', for 'investigation, research and discovery for the improvement of mankind', for the 'advancement of teaching', for 'international peace', for 'mental hygiene', etc., the Academies of Science, the League of Nations, etc., who have, or can have, at their disposal funds and employ different specialists, are the proper agencies to originate such an extensional neuro-semantic enquiry and eventual activities.

It seems also imperative that some leading universities should establish research chairs of General Semantics where specialists could be trained, and further researches and experimentations made. Here is an opportunity for private endowments.

Although Science and Sanity is written in the form of a textbook, and any scientist, educator, student, or parent can master the subject by himself and apply the extensional methods of General Semantics as a practical help in his own work and life, a great deal remains to be done, and the above three aspects are of equal importance; namely: 1) Governmental and institutional official interest in the problems of sanity. 2) Training of specialists in General Semantics. 3) Further researches and experimentations.

The future development of mankind, if it is to avoid increasing chaos and anarchy beyond scientific control, must have an independent new extensional branch of science, with trained specialists who will adjust and formulate human orientations, evaluations, etc., in conformity with developments of science of each date. Such a special discipline would facilitate teaching and learning, would eliminate many neuro-semantic maladjustments and conflicts in all fields of human interest. Intensional systems and orientations must involve disagreement, and extensional General Semantics by necessity involves a theory or orientation of 'universal agreement'; and an unbelievable amount of conflicts at breakfast tables, teachers' desks, national and international conference tables, etc., would disappear automatically.

It would also give to the masses of mankind, as well as to the professions, elementary and simple modern structural data about the world and ourselves, without which human nervous adjustment and so general sanity are neurologically impossible. General Semantics attempts to formulate such an extensional neurological discipline, and as it discloses intensional causal factors of maladjustments, it thereby indicates new direct neurological therapeutic and preventive educational extensional methods against maladjustment. No education can be considered complete, or sufficient, if it disregards the first fundamentals of education, to supply the child or the student with up-to-date orientations and the most efficient extensional neurological means for adjustment, and

thereby sanity, and to prepare them for constructive work and socially healthy, useful life.

Cora Williams, the President of Williams Institute, Berkeley, California, in one of her lectures on General Semantics advances a new and important evaluation as follows: 'Science and Sanity completes a trilogy of which Aristotle's Organon is the first volume and Bacon's Novum Organum the second. While widely separated in point of time, all three volumes deal with our human quest for reality. The Organon formulates the laws by which the subject thinks; the Novum Organum, the laws by which the object is known; and Science and Sanity, the laws which unite these two processes.' (Italics are mine).

This seems to be profoundly true and General Semantics as an experimental science attempts this new and specific task, to 'unite these two processes' and to fill this acknowledged serious gap which as yet has prevented the application of general (not particular) findings and methods of science of each date to education and life. As it turns out, this methodological integration helps to integrate the personality, helps the integrating functions of the nervous system, and so becomes the first neuro-semantic step toward general adjustment and sanity. We do not separate elementally any longer the 'observer' and the 'observed', but realize that they are inseparably united, as has been acknowledged for some time in modern non-elementalistic physics. Hence in General Semantics we do not deal with elementalistic intensional 'logic', 'philosophies', 'psychologies', etc., but with human extensional living orientations, nervous and semantic reactions, coherence, and other nervous reactions of the organism-as-a-whole, integrating and not splitting the personality, as was done automatically by the older elementalistic language and disciplines. Thus extensional General Semantics helps directly the human nervous system to perform its natural functions properly, by eliminating the harmful factors which the older intensional teachings imposed unknowingly on the human nervous system.

When the governments of the world become as actively interested in the problems of sanity, as they are now active in the problems of prevention of contagious diseases, in vaccination, etc., then perhaps mankind may expect a solution of its vital problems, and begin to build a saner, happier and neurologically a more human civilization.

MATHEMATICS AND THE SCIENCE OF SEMANTICS *

By Cassius Jackson Keyser
Columbia University

(Excerpt)

Whoever reads Science and Sanity attentively, whether he fully agrees with the author at all points or not, will readily understand why it has been so heartily acclaimed by so many distinguished scholars representing so many widely separated fields of research....So immense and manifold is its content, explicit and implicit, and so far-reaching its diversified ramifications, that no one can form a fairly just estimate of its character and importance without examining it open-mindedly and deliberately, with due regard to all the cardinal criteria for judging the merits of any elaborate work of science....

Aim and Means. Korzybski's aim, first publicly intimated by him twelve years ago in his Manhood of Humanity, is truly magnificent, being nothing less than that of constructing the foundation of what ought to become, and, unless our race decays, eventually will become, the greatest of all the sciences, the Science of Man....Naturally the aim determined the means. These involved a dozen years of arduous researches in what one may call, for the want of a better term, the anatomy of human behavior, not in any puny Watsonian sense of the term, but in the most comprehensive sense, by which any action, conscious or unconscious, 'physical' or 'psychical', of any human organism is a constituent part of human behavior....

Principles, Assumptions, Postulates....(1) The structure of the world is such that it is made up of absolute individuals; (2) There is no such thing as an object in absolute isolation; (3) Words are not the things they speak about; (4) Every assertion of identity is false--all identifications being blunders; (5) No discourse can define all of its terms; and there are other examples. A fairly good general clue to further principles of the work--some of them seemingly submitted as facts, others as assumptions--is found (pp. 92-94) in an incomplete but extensive list of traditional postulates explicitly rejected by the author, and in an immediately following list of explicit acceptances. Among such rejections are: (1) The postulate of the adequacy of the subject-predicate form of propositions; (2) The postulate of the universal applicability to propositions of the so-called Law of Excluded Middle; (3) The postulate that in rational discourses one may legitimately employ the is of identity; (4) The postulate of the cosmic validity of grammar; (5) The postulate of elementalism, underlying the well-nigh universal practice of employing such phrases as 'soul' and 'body', 'space' and 'time', 'matter' and 'spirit', 'emotions' and 'intellect', and so on, as if the meaning of either term of any such couple differed ultimately and radically from the meaning of its mate and admitted of separation therefrom....

Cardinal Concepts....The principal ideas or focal concepts which it is the concern of Science and Sanity to present, expound, and evaluate, and which give the work its substance, its distinction, its dignity and its significance, are not difficult to list, being denoted by such oft-recurring terms and descriptive designations as the following: order; relation,....especially asymmetrical; structure,....of the world,....of language, neurological structure,....; abstracting,....of higher and lower orders or levels; speakeable and unspeakeable levels,...., identification or confusion of the dif-

* Read at the Ellensburg Congress, 1935. Complete text published in Scripta Mathematica, 1934: 2, 247 (from which this excerpt is reproduced by permission of the author and of the editor).

ferent orders or levels and of the corresponding abstracts or products...., objectification of abstractions, consciousness of abstracting; human copying of animals; confusion of descriptions and inferences; systematic ambiguity, or multioridinality, of the meanings of familiar terms; non-identity; elementalism and non-elementalism; organism-as-a-whole; non-ailness; infinity; Aristotelian and non-Aristotelian; behavioristic and linguistic aspects of Mathematics and Science; semantics and semantic reactions.... The general science of human semantics must have for its subject-matter the entire range and body of significant reactions or responses of the human organism to the countless kinds of stimuli, internal or external, verbal or non-verbal, that play upon it at any stage of its life from the first to the last. It is, in a word, the science of significant behavior.

Major Themes....It is held that to establish sanity, peace, and prosperity in the private and the public life of mankind it is absolutely essential, and almost sufficient, to do two kindred things, both of them regarded as feasible. One of them is so to transform and reconstruct our familiar inherited languages that the structure of our daily speech shall be free from the manifold vicious elements of primitive mythologies and primitive metaphysics now ingrained in the intimate structure of even the most refined of vernaculars. The other is the relatively easy education of children, and the relatively difficult education of adults, in the Consciousness that, by neurological necessity, they continually abstract, that their abstractions belong to different orders or levels, and that, in the interests of sanity, right evaluations, and life-promoting or time-binding adjustments, it is both necessary and possible habitually to avoid identifying or confusing the things of one order or level with those of another....It is held that, regarded as a language, mathematics has a linguistic structure conforming better than any other language to the structure of the human nervous system and the structure of the world. And it is held that as a mode of behavior mathematics exhibits human behavior at its best....

Some Queries, Doubts, and Reservations....It would be quite unexampled....if a boldly pioneering work having the proportions and character of Science and Sanity--sharply challenging, as it does, and rejecting so many long-established principles, and ardently urging so many far-reaching reformations of methodology--did not raise....questions [of validity, cogency, and adequacy] in the reader's mind....[The author devotes five pages to discussion of the principles denoted by the terms non-Aristotelian, non-identity, and non-elementalism, and of Korzybski's criticism of the terms infinite-simal, infinite, and ailness.]

Final Estimate of the Work as a Whole. Despite all the reservations that I have felt constrained to make and of others that might be made, I feel bound to say that this work, taken as a whole, is beyond all comparison the most momentous single contribution that has ever been made to our knowledge and understanding of what is essential and distinctive in the nature of Man. There can be no doubt of its being a work that every serious student, no matter what the field of his special interest, ought to have as an indispensable part of his equipment. With its findings, all capable men and women desiring to be in touch with the best thought of their time will be obliged to reckon. No library that has not at least one copy of Science and Sanity can rightly claim to be quite up-to-date.

Korzybski's work is submitted as an Introduction to the Science of Semantics: His was a pioneering task. Great as is his achievement, it is only the beginning of his high empiria. Problems calling for further investigations by himself or by others under his leadership crowd upon him from every side. A department or chair or professorship of General Semantics ought to be established without delay in some great university where under the direction of Count Korzybski researches in Semantics could be

carried on and where students could be trained to render similar service in other institutions. I can, moreover, think of no way in which colleges for the training of teachers could confer a greater boon upon their students and, through these, upon their future pupils than by providing a substantial course of instruction in the educational bearings of Science and Sanity.

EXTENSIONALIZATION IN MATHEMATICS, MATHEMATICAL PHYSICS, AND GENERAL EDUCATION. GENERAL SEMANTICS *

By Alfred Korzybski

Institute of General Semantics, Chicago

This paper generalizes a method originally introduced in mathematics which I call 'extensionalization', applicable to general linguistics, of which mathematics, mathematical physics, etc., are only particular and special cases. It appears that methods and orientations which have made mathematics, mathematical physics, etc., the most advanced and effective branches of human knowledge at each given date, represent only general linguistic issues and are applicable to daily life, education and training for sanity ('mental hygiene'). It is known that terminology, which always represents social structural assumptions, is the secret of the effectiveness of science and mathematics. In the general daily language, we find common terms in use which structurally misrepresent events and so lead us astray, but we find also other terms which may and will play the role of scientific terminology with an efficiency in life, education, training for sanity, etc., comparable to the efficiency of exact sciences. These issues are unexpected and novel, yet for the last two years they have produced empirical results as attested by co-workers in General Semantics and partially presented before the First American Congress of General Semantics, held March 1 and 2, 1935, at the State Normal School, Ellensburg, Washington. It must be stressed that the issues are strictly empirical, and that when the broader semantic aspects of physico-mathematical methods are applied to life, some 'incurable' 'insane' persons become 'sane'; 'morons' after semantic retraining become nearly 'normal'; some of the worst students in schools, colleges or universities become the best; many kinds of maladjustments disappear, etc., and finally difficulties in learning mathematics, etc., become largely eliminated.

Historically it is very difficult to trace the origins of 'extensionalization'. Records show that the use of 'indexes' was known and utilized by the ancient Egyptians. It seems that by the 18th century mathematics had developed to the point where an infinite number of symbols was needed for further development. Obviously no alphabet or number of actual or manufactured alphabets could supply this infinite number of needed symbols. Mathematicians solved this difficulty simply by the introduction of upper and lower indexes. The development of mathematics and mathematical physics as a consequence can be traced to this principle, which began with say, x_1, x_2, x_3 , etc., which produced the needed infinite number of symbols and culminated lately with the tensor calculus, and the following revolutionary consequences, and symbolism of the type $\int \dots$. In General Semantics by special indexing devices it is possible to transform the older and popularly prevalent newtonian and biblical (5000 ? B. C.) 3 + 1 dimensional primitive orientations to modern four-dimensional einsteinian orientations which uniquely in 1935

* Paper presented before the Mathematical Section, American Association for Advancement of Science, St. Louis, Missouri, January 2, 1936. Reproduced by permission of the author.

are capable of representing the world of 'realities' (1935), and so become a foundation of sanity, which depends on 'adjustment to realities'. The technical mathematical fraternity does not realize at all that professional medical surveys predict that if something is not done, in a century or two there will be no sane white Smith_n left, mathematics or no mathematics. The facts are known: professionally, yet unfortunately mathematicians are too little interested in the foundations of mathematics and the deeper problems of linguistic and methodological problems of mathematics to be able to understand that mathematics represents only a narrow and special 'ideal' language, Smith_n-made and for Smith_n's use, but which discloses the mechanisms of human adjustment and therefore sanity. The aim of science, with the help of the language called mathematics, is predictability. When an engineer builds a bridge, etc., he speaks to himself in the language of mathematics which we call 'calculation'. The security of the bridge is connected with predictability that the bridge will not collapse under predictable conditions. The physical structure of the bridge and the predictability of its use depend primarily on linguistic issues, in this particular case called 'calculation'.

Theoretical as well as numerous empirical data prove that similar conditions can prevail in daily life, in which predictability, as a base of human adjustment, sanity, happiness, etc., may be secured by the proper selection from ordinary language of special orienting terms, which become scientific terminology for the new 'science of man', for which General Semantics (A General Theory of Values) is paving the way.

What is of utmost importance is the unsuspected fact in life (common knowledge in science and mathematics) that this new structurally correct terminology works automatically and unconsciously toward optimum adjustment, etc., and sanity. It was never suspected, although quite obvious once discovered, that in science and mathematics we find factors of sanity.

As all evaluation, mathematical or semantic, represents a semantic process inside our skins, and as most human inside reactions can be interpreted in terms of evaluation it is imperative to enquire into the factors which underlie this evaluation. The discovery of these factors is the main subject of General Semantics.

If we consider the relationship between a territory and its representation in a map, we find that we can have two kinds of maps, thus:

Actual Territory:-	San Francisco	Chicago	New York
Map No. 1:-	San Francisco	Chicago	New York
Map No. 2:-	Chicago	San Francisco	New York

If we would choose to travel by map No. 1, we would find predictability possible, not attainable if we utilize map No. 2. Evaluating the situation we could say that map No. 1 is 'correct', 'right', etc., and that map No. 2 is 'incorrect', 'wrong', etc. It should be noticed that such words of evaluation, although in daily use, do not supply us with a workable terminology for evaluation. We can however find other terms taken also from ordinary daily language which become scientific terminology. Thus we observe, that for maximum predictability and so usefulness, a form of representation must be 'similar in structure' to the facts represented, this 'similarity' defined in terms of 'order'. The introduction of this terminology brings about fundamental consequences: 1) In the term 'order' we find a bridging term between mathematical physics and life; and 2) through 'order', we are capable of 'ordering the reactions', involving 'delay of reactions' which automatically stimulates the human cerebral cortex to its appropriate dynamogenic action, differential activation, etc. Experience and theory show that beneficial empirical consequences follow as stated before.

By observation of the relationship between the territory-facts and the form of representation (map-language) we discover three fundamental new non-aristotelian semantic premisses, namely:

- 1) A map is not the territory.
- 2) A map covers not all characteristics of the territory.
- 3) A map is self-reflexive (Royce) because an ideal map would include the map of the map, etc.

Observation of daily life and 'mentally' ill shows that the older and prevailing aristotelian orientations are based

- 1) On the 'is' of identity,
- 2) On 'allness', which we also flatly deny because both are false to facts, and
- 3) On the disregard of self-reflexiveness, which has been complete except in Russell's mathematical theory of types.

All that has been said here applies to language in general and any other form of representation. Thus,

- 1) A word is not the fact, situation, toothache, etc., and in general any direct feelings which occur exclusively on unspeakable levels.
- 2) A word covers not all characteristics of the facts.
- 3) Language is self-reflexive, as in language we speak about language, a tremendous difficulty which mathematicians have tried to solve by the theory of mathematical types.

A 'scientific theory' represents nothing else but a language of 'similar structure' which depends on special structural assumptions introduced by the terminology. The test is predictability and empirical verification. This introduces economy in human endeavours, an important factor of progress.

The main thesis of General Semantics and the present paper is that except in exact sciences which use, or try to use, a language of 'similar structure' to the known facts, establishing predictability; our daily orientations are based on language of dissimilar structure to the facts. This makes predictability in principle impossible. That's why bridges do not collapse, automobiles run, radios work, etc., but our social, economic, etc., systems collapse sporadically because we use unpredictable methods.

This thesis must be verified empirically by observation of linguistic facts. Thus in nature and in fact, 'space', 'time', 'matter'; or 'body', 'mind', 'intellect', 'emotions', etc., cannot be divided, which is a structural fact of this actual non-elementalistic world. However, these can be, and are divided, split, etc., by the existing elementalistic languages. Thus predictability becomes in principle impossible. Science has overcome lately this very serious discrepancy. In physics, for instance, the Einstein theory introduces the non-elementalistic language of space-time. In daily life, education, etc., General Semantics introduces the non-elementalistic language (terminology) of 'semantic reactions', 'evaluation', 'order', etc., of 'similar structure', etc., which works automatically for optimum adjustment.

The linguistic situation is even more serious, the more so, because unrealized and unsuspected even by respective specialists. It is a tragedy of the white race that extreme specialization leads necessarily to extreme general ignorance, which in the fields of self-knowledge fatalistically involves not mere ignorance but necessarily false knowledge. It is common knowledge, based on practice of psychiatrists, that this false knowledge is a 'powerful and prevalent factor' in promoting mental ill-health throughout the community, and the increased dissemination of such dangerous germs could

not be contemplated without uttering a note of warning'.* The scope of this paper does not allow me to go into actual cases, and endless empirical evidence.

Here we must introduce two more technical terms. A definition by intension (spelled with an 's') is one in terms of aristotelian 'properties'. Thus 'man' might be defined as a 'featherless biped' which eventually might apply to everybody and covers nobody. A mathematical and/or semantic definition by extension of 'man' would be the exhibiting of the individuals and defining 'man' as a class of individuals made up of Smith₁, Smith₂, Smith₃, etc. Here a crucial structural ('similarity of structure') issue looms up. By intension, or mere verbalism, we have only ONE 'man', while the world is made up of many absolute individuals; and so our standard intensional language falsifies facts. By extension we have many Smiths, and so an extensional structure of language is uniquely 'similar in structure' to the facts of the world. It seems that 'history repeats itself', and as the further progress of mathematics was made possible through extensionalization, similarly further human progress while preserving general sanity, is made possible by extensionalization, which is based on mathematical methods.

The standard and empirically demonstrated useful extensional linguistic devices are as follows:

- 1) Indexes, and potentially compound indexes
- 2) Dates
- 3) Quotes
- 4) Hyphens
- 5) Etc.

In connection with the fundamental non-aristotelian premises the indexes and the dates abolish the 'is' of identity and 'aliveness' of the aristotelian system. The quotes forewarn against speculations on elementalistic terms, which MUST lead us astray and away from 'reality'. The hyphens allow us in principle to make compound words structurally similar to the non-elementalistic world we happen to live in. The permanent 'etc.' indicates that in life it is impossible to exhaust verbally 'all' the characteristics and consequences of any actual occurrence. Here it must be emphasized that in actual life we could not entirely get away from extension and so we built up extensional expressions such as 'this chair' made up of intensional words. It is not realized that outside of a few relational mathematical terms most words stand only for 'verbal fictions', (which Carrel calls labels for 'schemes'), such as 'man' (while every Smith is actually different), 'chair', 'disease', etc. By the use of extensional devices such as 'chair₁₉₃₆' we are dealing four-dimensionally with all the consequences (but with no techniques) of the mathematical training and so make out of an intensional language an extensional one. Thus we have radically altered and adjusted the structure of language, without altering the language; the seemingly impossible has been accomplished. If we keep in our heads and utilize permanently these extensional devices with every word and statement, we gain considerably in adjustment and sanity. For instance an 'innocent' dating of a statement with indexes allows us security in dealing with it in 1936, without being dogmatic, absolutistic, etc., about 1937 issues. The scope of this paper does not allow me to go into details but I must mention four main issues:

1) That psychiatrists without knowing it apply nothing but extensionalization in all psychotherapy. For instance an intensional 'father' (extensional Smith₁) did harm to his child, the child begins to hate 'all' 'fathers' and ultimately becomes asocial, an unadjusted neurotic or psychotic. Not so by extension, the facts are not supposed

* Psychiatry in Medical Education. Edited by Ralph A. Noble, M. D. The National Committee for Mental Hygiene, Rockefeller Centre, New York City.

to be changed but the child confines his hate to 'Smithy' and no matter what he does, he will not become socially maladjusted, because his hatred will not spread on Smith₂, Smith₃, etc.

2) As a rule, extensional analysis of any problem leads to different and more fundamental results than intensional merely verbal and definitional analysis. Once these results are reached, they can be easily translated into the older intensional language, although the analysis appears deep and significant.

3) Without extensional devices it is impossible to talk sense in biology, physiology, neurology, medicine, etc., as we actually deal only with absolute individuals at an 'instant', and by intension deal only with verbal fictions, such as 'man', 'chair', 'disease' and what not, which Carrel in his book "Man, the Unknown" calls (much too mildly) 'schemata'.

4) It is important to realize that newtonian 'simultaneity' was verbalistic and intensional, and that Einstein went to the actual facts as to how 'simultaneity' is actually found and so extensionalized physics. It must be added that the operational method of Bridgman, quite appropriate for physics, is inapplicable in other fields and particularly in human affairs, and yet represents nothing but a particular case of extensional method.

At present we witness a sharp difference of scientific opinion as to the character of 'reality' in connection with the 'indeterminism' of the new Quantum Mechanics, 'the mystery of comprehensibility', etc. We still believe that the Einstein theory 'stands or falls by experiments', not realizing that besides formulating the specific Einstein theory, Einstein has departed in his work from intensionalism and applied thoroughly extensional methods; and so, no matter what experiments will show, we will adjust everything else, but not depart from this serious and beneficial methodological innovation.

In studying the latest physico-mathematical discussions on problems of 'reality', we find that they depend on some sort of 'psychology', which is antiquated and obsolete and so prevents any solution, although it helps the production of controversial papers. If we would apply extensional methods, as Einstein did in physics, we would stop playing on intensional verbal definitions, and we would investigate the facts about how 'knowledge' is produced. In other words, we would investigate neurology, physiology, colloids, etc., and we would discover that 'reality', etc., represent multiordinal terms for most-important multiordinal psycho-logical mechanisms, and a great many intensional verbalistic fictions and irritants would disappear.

For further details consult my Science and Sanity. Extensional analysis solves among others the notoriously unsolved problems of mathematical infinity, in a non-controversial form. It also eliminates the mystery of 'why mathematics'. Obviously if we define 'number' and explore the world with a 'class of classes', this must be as illuminating as exploring the world with the 'holy ghost', and leads nowhere. A semantic definition of 'number', given in Science and Sanity, in terms of relations, obviously eliminates the mysteries of measurement and mathematics. If we explore the world with relations, we get answers in terms of relations, which are factors of structure, and structure represents the only extensional content of knowledge. We understand therefore why through measurement and mathematics we are capable of gaining knowledge, and why we can find in mathematical methods structural factors of adjustment, and so sanity.

To sum up, mathematics, etc., being a product of the co-operative most-effective linguistic activities of many Smiths, disclose factors of human efficiency for adjustment, which means sanity. Also the necessity is indicated for the formulation of a broader and more general theory of values formulated in General Semantics, of which mathematics becomes only an important and elaborate special case. It is a pleasure to

be able to predict on experimental grounds that sanity of the white race may be restored and preserved not by abolishing extensional science and mathematics, as some serious scientists suggest, but by adjusting through extensionalization present human orientations, to conform with the extensional conditions of life, as actually produced by extensional science.

To avoid subtle confusion, let me add that 'pure' extension is humanly impossible, while 'pure' intension is possible and is found in hospitals for the 'mentally' ill, and some chairs of 'philosophy', in the universities of the world.

NON-ARISTOTELIAN SYSTEM AND GENERAL SEMANTICS *

By Oliver L. Reiser
University of Pittsburgh

We are a bewildered race, living in a confused world. Whether we look at the social situation or direct our attention to the domain of science and philosophy, we are greeted with paradoxes, incoherencies and chaos. Fortified by the last saving gift of Pandora - Hope! - and unmindful of the injunction to "beware of Greeks bearing gifts," we console ourselves with the reflection that we will somehow "muddle through". We pin our faith to "New Deals" which treat the symptoms, hesitating to probe deeper into the social organism for fear that a searching analysis would reveal the need for a more radical procedure. The idea that modern civilization faces a critical juncture, of which a business depression is but one symptom, is one which lurks in the background. Up to the present the censor has pushed this idea back into the limbo of the social unconscious. And yet the idea will not down, and with the passage of time it becomes increasingly evident that, if civilization is to survive, we must look the facts in the face and deal with realities as they are.

We are quite aware of the dangers of nationalism, economic imperialism, racial hatreds, religious bigotry, and so on. The Marxian socialists have preached about the inherent contradictions and cleavages growing within the capitalistic state. We have seen the decadence of religion as an instrument of moral guidance and social control. We realize that the modern industrial world is a mushroom growth based on subsidized research, and we have discovered that the benefits of this alliance have been gobbled up to satisfy the appetites of profit-seeking stock-holders of selfish corporations. We witness science, with the passage of time, increasing its power over nature in a geometric ratio, while its growth in knowledge and in wisdom appears to advance only in an arithmetic ratio. If the results of applied science are prostituted, the results of pure science yield Frankenstein monsters of fact which plague their discoverers. While cosmologists ponder the mysteries of cosmic rays, mathematicians stand befuddled before the paradoxes of Mengenlehre. In the meantime, not to be outdone, geologists and astronomers play celestial ping pong with the time concept, debating whether the cosmos can be younger than the stars of which it is composed. In the third ring of the scientific circus the psychologists entertain the audience with riddles: "When is a behaviorist not a behaviorist?" "When he is conscious!" To complete the tragic-comedy it needs only the last detail: educational practitioners dedicated either to the reiteration of archaic formulae, or blindly groping towards an unseen light--in either case an unimpressive performance in the face of an unparalleled opportunity!

* Read at the Ellensburg Congress, 1935.

All this adds to the gaiety of nations and would distress no one, were it not for the deep and troublesome suspicion that it is fiddling while Rome burns. And there's the rub! People love and want their Rome -- while yet it burns. The adventure of civilization is too high and zestful to allow it to come to an ignoble end, at least so early in the game. Humanity did not emerge from the long struggle of pre-human evolution to live only a fitful day upon our planet. We need the remaining acts of the drama to find out "what it's all about". The play's the thing, to be sure, but one can't understand the play without knowing the consummation to be sought; and to discover that, we needs must stay a little longer. Whatever Freud may say about the "death wish", and however strategic our position now may be for race suicide, the will-to-live is probably no less potent in us than in Neanderthal man.

If, therefore, we agree that the social organism wants to survive, and that it cannot go on living its reckless life and still remain healthy, we must call in a diagnostician. His problem is indeed a serious one. Is there any common cause of all these maladjustments and disturbances of function? Must we always merely treat symptoms, or is there some fundamental condition which, if correctly diagnosed, can be corrected and a cure effected? There are various questions, but I must confess that most of these clinicians do not appear to go to the root of the trouble. Part of the difficulty certainly lies in our faulty orientations to our physical and social environments, but the remedy is not merely a change in our habits of thinking, as some persons now urge. This may be necessary, but in addition to a change in the content of our "thoughts" there must also go a change in the very modes themselves. In other words, what is needed now is a change in the forms of our orientations, so radical that even the traditional "laws of thought" will have to be modified and modernized. But before considering this, let us state in more detail the diagnosis which underlies this proposed remedy for the troubles of modern civilization.

The difficulties and contradictions inherent in the confusion of modern culture are in a considerable measure a result of the fact that man, the human thinker, can do something which unthinking matter cannot do: he can fixate the "essence" of an "entity" by definition. This procedure, which provided the underpinning of the Aristotelian subject-predicate logic, is somewhat analogous to what the biologist does when he "fixes" a preparation by staining. By this process, realities which are fundamentally functional or behavioral facts of nature are "reified" by language into substantial, self-identical "things".

The type of definition which is peculiarly appropriate to the subject-predicate mode of thinking is "nominal" definition. A purely intensional logic will define the terms employed in propositions by statement of the connotations of the terms (words) used. Employed exclusively, this leads to definition by postulation, and the purely verbal (symbolic) discipline of a non-empirical science, such as formal logic. This type of thinking would cause us no trouble, provided we operated exclusively on the level of "concepts", and did not insist upon referring our "thoughts" to the world of "things", or the perceptual world of "concrete objects". It is because we must use "thoughts" in our orientations that we get into difficulties. Words and symbols must denote as well as connote. For this reason our semantic reactions (orientations) must have extensional reference no less than intensional meaning. Before going further, let us set down the contrasts between these two modes of definitions, as follows:

Intensional Orientations: Nominal or verbal definition; Connotations emphasized; Non-empirical science, with no facts; Definition by postulation.

Extensional Orientations: Real definitions employed; Denotation emphasized; Empirical science, based on "facts"; Definition by inspection.

It is because of the possibility of these two modes of "thinking" or orientation that we get into difficulties. Functioning in a "twilight zone", somewhere between the level of pure intension (or connotation) and pure extension (or denotation), we try to avoid confusion by observing the principle: render unto God (pure intension) the things that are God's, and unto Caesar (pure extension) the things that are Caesar's only to get lost in a bewildering confusion resulting from the fact that we do not know which words belong to what kingdom! Undoubtedly both God and Caesar are dismayed by the consequent chaos. The situation is twice confounded because men will persevere in the opinion that because they have a word, there must be a reality which corresponds to the word. Thus through reification and projection of concepts we create verbal fictions; by abstraction and hypostatization of our ideas we make things out of functions, or forms of behavior. This is illustrated by such a term as "consciousness", "force", "space", "justice", "democracy", and many others. In general, we give to airy nothings a local habitation and a name. This may be quite harmless in poetry; but it is vicious in science.

We have cited the dispute between the advocates of "real" and "nominal" definition as a general illustration of the confusion resulting from the dualism of extensional and intensional reasoning. The dispute between the geologists and astronomers concerning the "time" required for "earth" and "cosmic" evolution is a specific instance of the harmful effects of such a dualism. And just as Professor Bridgman sees the solution of the problems of Mengenlehre, in the application of the "operational" method in mathematics, (1) so we might propose that an operational definition of "time" would show that it is illegitimate to use the same term to cover such widely different meanings (sets of operations). The same comment would apply to the present dispute about "liberty". And this brings us to the main objective of the present essay: to call attention to the fact that the sources of our difficulties are set forth in great detail in the volume by Count Alfred Korzybski, Science and Sanity, An Introduction to Non-Aristotelian Systems and General Semantics. It is to the credit of Count Korzybski that he not only sees the source of our confusion, but indicates the proper remedy.

In this volume Korzybski points out that the difficulties created by intensional treatments (definition by intensional fixation, we have called it) are encouraged by the fallacy of conceptually lifting a "thing"--which is really a macroscopic, space-time fact composed of microscopic events--from its environment or context and considering it as an independent reality. The fallacy of treating an abstracted entity as a thing-in-itself is termed by Korzybski the fallacy of elementalism, and it is closely linked with the fallacy of identification. Korzybski constantly emphasizes that "facts" come first in nature (even though facts are themselves a result of abstraction), and that our propositions about facts, and then theories (or scientific systems) as complexes of propositions, come next, respectively, in the order of genesis and importance. A purely intensional treatment, utilized as a basis for science and applied to the world of facts, would further make the facts conform to the definition, and this would lead to the creation of the verbal fictions of the subject-predicate logic and would, furthermore, be reversing the order of importance and genesis of the "units" of our semantic reactions.

All scientific analysis is made possible through the power of abstraction which men possess. This human element enters in the process of selection whereby we isolate and study "objects", the "phenomena of nature", etc. This begins even with "perception", for vision itself involves sensory abstraction of an "object" from its "background". But we must not forget the wider context or environment within which each fact exists.

(1) "A Physicist's Second Reaction to Mengenlehre", By P. W. Bridgman, Scripta Mathematica, 1934, Vol. II, 3-29.

In the biological organism this fact that any organ, such as the heart, or brain, or stomach, is a part of an organism-as-a-whole situation is recognized, and so we are not likely to think in elementalistic terms or be guilty of identifications. That the same non-elementalistic or non-additive situations occur throughout nature is also insisted upon by Count Korzybski. Thus Einsteinian theory of relativity emphasized the non-additive character of a general physical situation, in that the familiar (additive) formula for the compounding of velocities (addition of vectors) is rejected when dealing with the velocity of light. In another respect the Minkowski-Einstein doctrine compels us to recognize the fallacy of elementalism, namely, in that it teaches us that every fact of nature is a space-time fact. For Korzybski this has the additional significance that it provides us with supplementary proof of the inseparability of "mind" and "matter", and of "thinking" and "emotion".

It is because of the possibility of viewing and analyzing "things" and situations from different contexts, and in different "environments", that the likelihood of false identifications is increased. When we are "conscious" of "abstracting" and refuse to identify the "individuals" of different "levels of abstraction", we can avoid the danger of the confusion of meanings of multi-ordinal terms, or terms with different meanings on different levels of abstraction. Only a correct symbolism--names with subscripts indicating dates--representing the proper level of abstraction can prevent false identifications. Such a symbolism alone makes possible a truly extensional orientation, where there is a unique symbol for each unique fact of nature. It may appear paradoxical, but it is an interesting fact that Aristotelian logic, which insists upon respect for the "law of identity", is itself unable to live up to its own requirement, since, in order to semantically ascribe single values to the terms we use, we need an extensional, infinite-valued orientation, rather than the two-valued orientation, demanded by Aristotelian logic.

It is highly essential to realize that Korzybski does not deny that on the same level of abstraction (or in what the older treatment called the same "universe of discourse") words (terms) should retain constant meanings, i.e. the same term should have the same "referent". This principle of symbolic univalence is essential. This, however, does not contradict the statement that identification as an orientation leads to disaster. The beginnings of animal intelligence are associated with identification, but in man this principle must be replaced by the recognition of the fact of non-identity, for we now see that non-identity is as much a "law" of nature as the "law" of gravitation. Man must learn not to "ape" or copy the reactions of lower animals.

At this point it is appropriate to pause for a moment and examine a possible criticism of the non-Aristotelian orientation. It will be argued by some that even though in nature we never discover true instances of "absolute identity in all respects", nevertheless, to the extent that we employ mathematics in science, we need the notion of "identity", as Emile Meyerson has argued at great length. In commenting upon this point let me say first that if we take a mathematical equation as an example of an "identity", as Meyerson proposes, it turns out that the "equality" asserted between what is on the left and the right sides of the equality sign is by no means an "identity", as Professor Whitehead has pointed out (2). In the second place, even in purely formal logic and mathematical logic, dealing with pure intension, the meaning of, and necessity for, the notion of "identity" is still to be established. The classical work in this field is the Principia Mathematica of Whitehead and Russell. But no less an authority than F. P. Ramsey (3) argues that one serious defect of this monumental work is found in the treatment of "identity". Ramsey states (op. cit. pp. 30-31) that the definition

(2) The Principle of Relativity, by A. N. Whitehead, 1922, Ch. III.

(3) The Foundations of Mathematics, 1932.

"does not define the meaning with which the symbol for identity is actually used". To escape the difficulties of the idea Ramsey proposes that we adopt the suggestion of Wittgenstein (4) and eliminate the sign of identity, replacing it by the convention that different signs must have different meanings. Thus it appears that the notion of identity is not even a necessary constituent of purely "logical" notation!

In concluding this essay, and in reaffirming our remarks about the practical values of Korzybski's treatment, let us remind ourselves that human problems grow out of linguistic abuses. Our difficulties of adjustment, individual and social, are neuro-semantic and neuro-linguistic in character. Only by retraining in an extensional orientation can we undo the evil effects of false identifications. The infinite-valued orientations which Korzybski's system requires call for a new canalization of energy. This is a laborious process; but the end justifies the effort, for the results are automatic, far-reaching and beneficial. Thus it turns out that the true science of human adjustment is a psycho-logic, a science of living semantic orientations, which is only now coming into existence.

MEANINGS IN MULTI-VALUED LOGICS*

(Toward a General Semantics)

By William Maria Melisoff

University of Pennsylvania

(Editor of Philosophy of Science)

The aim of this contribution is to trace the transformation of the meanings of certain terms as the order of the logics in which they appear is raised. By "order of the logic" we simply refer to the number of truth-values characterizing the logic, so that if the number of truth-values shows symptoms of traveling to infinity we may speak of the goal as a logic of infinite order. This goal seems to be what is meant by Korzybski when he speaks of "general semantics."

I

Let us first set up the most general structural formulation of two-valued logic. For our purposes the simplest case of only two propositions will suffice. Designate them as p and q, and also designate the two (postulated) truth values as T and F, standing for "true" and "false". For a relation between the propositions the abbreviation R is convenient. Our problem is really to set up all the possible structures pEq in terms of the truth-values, T and F, which are applicable to p, q and pEq, regardless of the meaning of p and q. We seek the fundamental morphology of R -- its structural meaning.

For the analysis of structure the most powerful procedure seems to be to set up a matrix or array, which will reveal the group character and unity of all so-called alternative logics each of which glorifies a single version of R as primary. Immediately it is apparent that R can have only 16 possible interpretations, revealed as patterns of T and F, as follows:

(4) Cf. Tractatus Logico-Philosophicus, by Ludwig Wittgenstein, 1922, p. 139.

* Read at the Ellensburg Congress, 1935.

R	IF p q are T T	TF	FT	FF	In words R means or may mean
pR ₁ q is	T	F	F	T	equals
pR ₂ q	T	F	T	T	implies ₁ (Russell)
pR ₃ q	T	T	T	F	or ₁
pR ₄ q	T	F	F	F	and
R ₅	F	T	F	F	-----
R ₆	F	T	F	T	"induces"
R ₇	F	F	T	F	-----
R ₈	F	T	T	T	"complete identification"
R ₉	F	T	T	F	"diverges from"
R ₁₀	F	T	F	F	"contracts"
R ₁₁	F	F	F	T	"neither...nor"
R ₁₂	F	T	T	T	"isolated from"
R ₁₃	F	F	T	T	-----
R ₁₄	F	F	T	F	-----
R ₁₅	F	T	F	T	-----
R ₁₆	F	F	F	F	"complete discrimination"

If the relation is such that R₁ means "equals", then if p is T and q is T, pR₁q is T; and if p is F and q is F, pR₁q is T; otherwise (the two middle columns) pR₁q is F, i.e., when the truth values of p and q are not alike. We say that the row TFFT is the structural meaning of "equals". The structural meaning of "implies₁" is "FTT", that of "or₁" is "TTTF". There are only 16 possibilities. Eight are the mirror images of the other eight. Thus R₉ is the mirror image of R₁ and for purposes of illustration only we have called the relation "divergence". In elucidation we may say divergence is "difference in truth value". It does not have to mean "inequality" if a universe of discourse can be set up in which TFFT and FTFE are not contradictories. "Worlds" R₉ and R₁₆ are curious; in the former all propositions are truly linked, in the latter none are linkable. Which is insane?

II

Let us derive the same kind of array for a three-valued logic. The three values can be designated as T, F and D, the latter standing for "doubtful". We get 2 arrays; one, if we take pRq to have only the values T and F; the other if we take pRq to have the possible values T, F and D. Thus:

First Array

	TT	TD	TF	DT	DD	DF	FT	FD	FF	In Words
pR ₁ q	T	F	F	F	T	F	F	F	T	equals ₁
pR ₂ q	T	T	F	T	T	F	F	F	T	"jibes with" or equals ₂
pR ₃ q	T	T	F	T	T	T	F	T	T	"participates in" or equals ₃
pR ₄ q	T	F	F	T	T	F	T	T	T	implies ₁
pR ₅ q	T	T	F	T	T	F	T	T	T	supplies or implies ₂
pR ₆ q	T	T	F	T	T	T	T	T	T	"coheres with" or implies ₃
pR ₇ q	T	T	T	T	T	T	T	T	F	"or ₁ "
pR ₈ q	T	T	T	T	F	F	T	F	F	"or ₂ "
pR ₉ q	T	T	F	T	T	F	F	F	F	"or ₃ "

We have now several rows that can be given as the meaning of "equals", "implies", "or" and the like. It becomes clear that the meanings have become transformed. There are several where one grew before. Hence we have to create new terms to show the shadings, or speak of let us say, "or" in three or more senses and the like. In such a case when we say "Either the sun will shine or my appetite will suffer" we can mean several different things as we assign T, F and D values to the constituent parts of the assertion, and as we choose R_{200} , R_{201} , R_{212} or some other structural meaning of "or".

Second Array

	<u>TT</u>	<u>TD</u>	<u>TF</u>	<u>DT</u>	<u>DD</u>	<u>DF</u>	<u>FT</u>	<u>FD</u>	<u>FF</u>	In words
R_1	T	F	F	F	T	F	F	F	T	equals ₁
R_2	T	T	F	T	T	F	F	F	T	equals ₂
R_3	T	D	F	D	T	D	F	D	T	equals ₃
R_4	T	T	F	T	T	D	F	D	T	equals ₄
R_5	T	D	F	D	D	D	F	D	T	equals ₅
R_6	D	T	F	T	T	T	F	T	T	equals ₆

and so on.

The number of meanings has expanded still more.

We can now calculate in the First Array 512 possible values for the relations R; in the Second Array 19,683 values.

III

The number of possible simple structures of 2 propositions in n-valued logic for the Relations R in pRq are:

(a) If constructs are to be true or false only: 2^{n^2}

(b) If constructs are to have n truth values: n^{n^2}

If n approaches infinity our goal can be pictured [using the symbol aleph]:

Either 2^{\aleph^2}

or \aleph^{\aleph^2}

There results an infinite number of meanings which at least on one interpretation may have the power of the continuum, even if we restrict ourselves to denumerable infinities of meanings of truth-values.

However, a goal is that which is kept in view (symbolically) but is never reached.

V

If general semantics be such a goal, it will never be reached, but should offer endless occupation to the "animal" that is the most easily bored.

LOGICS: SUBVERBAL, VERBAL, AND SUPERVERBAL:*

An approach to an evolutionary psychology

By Selden Smyser

Central Washington College of Education, Ellensburg

Let us attempt in thirty minutes to trace the million-year history of man's blundering yet ever more successful efforts to learn to think, to solve problems, to co-operate, construct and create. If we can trace the important steps by which the man-animal has become man and has developed thought patterns for the discovery of the truth he needs to guide his action and to solve his problems, we shall in so doing indicate the essential nature of a phylogenetic psycho-logic of importance for a fundamental science of education, i.e. a science of the evolution of human intelligence.

For the purposes of gaining this long view - this anthropological view of the evolution of racial thought patterns, let us tentatively consider as logics all the various complexes of culture traits which even in successive culture levels have used to discover "truth" and "knowledge". That is, let us class as logics all those patterns of culture traits which have actually functioned as logics. Let us define the term "logic" functionally, anthropologically, realistically, extensionally. Let us consider as logics all those various complexes of culture traits which social groups and the thinking experts of those groups have accepted as the techniques for the discovery and establishment of truth in the various cultures.

If we define the term "logics" thus to include all those thinking behavior patterns and complexes which man has institutionalized for the discovery and establishment of "truth" we shall find in the long period from the Peking man to man of today an immense range and variety of such socially established methods for discovery of truth. It is a variety so great that to describe these thought patterns would take not thirty minutes but a work comparable with Frazer's "Golden Bough". It would relate and describe in interminable detail rules for observing the flight of birds, for studying the entrails of sacrificial animals, the shoulder blades of sheep, the position of the stars, rules for divination by the use of water, the observation of the winds, the questioning of oracles, the prayers for signs, the interpreting of dreams, the application of proverbs and fables, phrases and texts from sacred books, the words of Moses, Aristotle, Galen, Lao Tzu and scores of others, the linking of proposition to proposition to form syllogisms, the use of arithmetic, statistics and methods of higher mathematics, the use of instruments - scores of scopes and meters, the experimental apparatus set-ups, slide rules, calculating machines, differential analysers, mechanical drawing, graphs, interpolation and extrapolation of curves, the principles of symbolic logic and of scientific method.

The highly generalized abstracted logic of the academic student does not function as logic very extensively anywhere in the world. It does not function as the medieval school-men and others long believed logic could and would function. It is only the intricate complex methods of science with all its instruments, and special techniques of the special sciences, that today constitute the organon for the discovery of truth. The medieval dream of a verbal logic for the discovery and establishment of truth seems about to take its place with the dreams of the alchemists and the astrologists. As astrology and alchemy - before they came to be separated from astronomy and chemistry - contributed much to the stumbling forward movement of human intelligence, so the various logics, primitive and medieval, have made real contributions to human thinking. However, it seems probable that the great faith of men of the western world in the power of pure-

* Read at the Ellensburg Congress, 1935.

ly verbal logics to discover absolute truth has through wars of religious and political sects done far more damage to mankind than alchemy or astrology ever did.

If now we attempt to indicate extensionally in the briefest practicable way the various types of logics that have developed with the development of human intelligence, we shall have in rough outline a history of human intelligence, a phylogenetic psychology, a fundamental pure science of education. Such a vista down the long reaches of a thousand thousand years will, perhaps, take somewhat the form here outlined.

The four great steps - the four emergents in the evolution of human thinking, may be indicated as:

(1) Thinking by bodily activity, organismic thinking carried out by means of tools, weapons, artifacts, etc. This we shall call subverbal thinking. It seems to have been the dominating type of thinking among man for say 990,000 years of the possible million years man has been becoming man. It is still fundamental.

(2) The second great step in man's learning to think was through the use of language. The use of language probably was developing very slowly through nearly all of the previous stage. But for the last ten thousand years there seems to have been a tremendous continuous acceleration and expansion of verbal and literary thinking. This is correlated much less with the activity of the whole body than man's thinking in the first stage. It is correlated rather with arbitrary sound symbols, with movements of the vocal organs and generally increased activity of the central nervous system. This development we shall call the stage of verbal and literary thinking.

(3) The third type of thinking to take on great acceleration and to greatly modify the patterns of thinking behavior that had previously developed and to change the structure of culture and institutions, is very recent. The great acceleration in this mode of thinking and discovering truth has taken place chiefly in the last 1000 years. This is the superverbal form of thinking behavior, which consists of thinking by the manipulation of stripped or pure symbols according to fixed patterns. It is best represented in several respects by arithmetical thinking carried on by means of the Hindu-Arabic number system as developed in Europe during the last six hundred years. Similar modes of thinking by patterns for manipulating symbols are found in all branches of higher mathematics, in symbolic logic, and in very highly developed form in chemistry. This mode of thinking is changing the functioning of man's nervous system and bodily organism far more than is yet realized.

(4) The fourth stage in the development of the human psychology and logics of problem solving is little more than 300 years old. Yet already this new psychology and new logic have transformed the structure of culture and of social institutions at a rate never approached before in all the history of mankind. This fourth stage in the development of man's ability to think consists fundamentally in the integration of the patterns of subverbal, verbal and superverbal thinking in the highly complex patterns of the varying scientific methods of the various sciences.

Subverbal activity thinking with things now becomes experimental thinking with apparatus and with instruments that magnify the power of man's senses thousands of times. It modifies equally both the precision and the power of his hands. Verbal thinking about the world and man, which began to take definite thinking form with the Greeks, has developed a terminology for a score or more sciences which give to some 10,000-15,000 words a definiteness and uniformity of meaning which no words in the world possessed in the days of Socrates and Plato.

Thinking by quantitative symbols - arithmetically, and by the established patterns of engineering, has given the world mass production, world commerce, the great engineering constructive activities of the modern world. Arithmetical thinking abbreviated and improved by higher mathematics makes possible along with a new precision in the use of words and in the use of instruments not one but many new logics or techniques for the discovery and establishment of new kinds of truth - truth that grows and develops as living things grow and develop.

These then are the four great steps - the emergents in the development of man's ability to think:

I	The period of subverbal thinking	1,000,000 years
II	The period of verbal thinking	10,000 years
III	The period of superverbial symbolic thinking	1,000 years
IV	The period of integrated collective thinking through organization of I, II, III into scientific method	300 years

Great as these periods of thinking vary in the length of time that each covers, yet it is to be noticed that each new stage so accelerates the rate of cultural and social change that the results of each of the shorter and shorter successive periods are not less but greater than the changes brought about in the million years of the first stage of human thinking.

Let us conclude this outline of the history of man's learning to think - the history of the cosmic education of man, by cataloguing or listing some of the types of thought patterns for problem solving that have been extensively used by man in different stages of his development.

I. In the subverbal stage of man's thinking, when he thought by the activity of his whole body, making and using tools, weapons, etc., some of the typical patterns of thinking behavior may be indicated as follows: 1. The fumbling trial-and-error method of primitive pragmatism (experimental); 2. The rigid adherence to established patterns of procedure (conservative and cumulative); 3. Divination: more than 50 kinds have definite names; 4. Casting of lots; 5. Interpretation of omens; 6. Inspection of entrails of birds, fish, etc.; 7. Many others.

II. The verbal stage of the development of man's ability to think brought many new patterns for thinking behavior which, each in its own day, were as vital as are the most valid results of science today. What we now call forms of literature were all patterns for thinking and the establishment of "truth": 1. Folk animal stories; 2. Myths; 3. Proverbs; 4. Fables; 5. Parables; 6. Ballads; 7. Histories; 8. Psalms; 9. Words of founders of religions; 10. Sacred books (bibles). The development of the Aristotelian logic and the syllogism was an attempt to develop verbal thinking in as idealistic a way as alchemy and astrology were attempting to develop chemistry and astronomy.

III. The superverbial thinking through patterns for the manipulation of pure or stripped symbols gives us thought patterns and procedures of the following types: 1. Arithmetic; 2. Algebra; 3. Cartesian Geometry; 4. Trigonometry; 5. Calculus; 6. Chemical symbols; 7. Symbolic logic; 8. Mechanical drawing; 9. Maps and globes, etc. How much these, especially the first, are transforming man's thinking is not yet clearly recognized.

IV. The integration, during the last three and a half centuries, of the three

fundamental types of thinking into the methods of modern, quantitative experimental science constitutes the four great advances in human thinking. The logics of scientific method utilize: 1. Instruments--meters, scopes, etc., that magnify the range and precision of man's senses and of his movements, one to ten thousand times. 2. Seven to twelve thousand technical terms that have a definiteness of meaning which few general words in all the world possessed in the days of Greek pre-science. 3. Highly developed symbols and patterns for thinking mathematically by means of these symbols with various mechanisms (slide rules, integrators, differential analysers, etc.): which united with 1 and 2 above give us the one or two score logics of the various sciences (special) and of general scientific (1) geology, (2) astronomy, (3) physics, (4) chemistry, (5) biology, (6) paleontology, (7) archaeology, etc.

Such in rough outline are the four chief stages in man's learning to think. Such also are some of the types of special logics which have functioned in the past or which are actually functioning today for the discovery and development of specific kinds of truth. The hope of a universal verbal logic for the discovery of "eternal truth" is like the dream of the alchemists and astrologers.

GENERAL SEMANTICS AND GESTALT PSYCHOLOGY*

By Raymond H. Wheeler
University of Kansas

In response to a request by Count Korzybski, that I write a paper for the First American Congress of General Semantics, I concluded that, as a psychologist, I could not do better than to point out some important and vital agreements between Semantics and Gestalt psychology.

First, however, I want to congratulate Korzybski for the great contributions he has made, and for his untiring and lonesome efforts to bring about a much needed change in our method of thought. I doubt if there is anyone who sees more clearly the moral influence which relativity is bound to exert upon civilization, or, who more cheerfully faces the difficulties which planners always face. Second, let me congratulate Dr. Trainer, Dean Uhl and Ellensburg Teachers' College, for their leadership in helping to develop the new science of semantics.

I look upon the work of Count Korzybski, and the Gestalt movement in psychology, as two events among numerous others, which mark a scientific enlightenment equalled by none except the 17th century. This enlightenment is due eventually to transform civilization, just as did the period from Kepler and Galileo to Newton and Leibnitz.

The 17th century forced upon humanity the concept of natural law, but only with respect to the external world. The 20th century will force upon the consciousness of humanity the subordination of mind and society to natural law. The first of these great events emancipated man from the bondage of superstition regarding his physical environment and biological structure. The second will in time emancipate him from himself--from the bondage of unhealthy conceptions of himself and of society, from inadequate ways of reasoning, from prejudice, intolerance, fear and war.

* Read at the Ellensburg Congress, 1935.

The secret of this social and moral emancipation is the principle that freedom is derived from subordination. Freedom of the part is derived from membership-character in the whole. The important aspect of any whole is its form, or, as Korzybski says, its unitary structure. Further, each part has a unique position in the whole, acquired through individuation, under laws of dynamics. This applies to physical, biological, psychological, and social wholes. A similar principle applies to "logical" wholes.

Korzybski's insistence, therefore, upon extensional thinking, is a happy one. The special case is always in some respects unique. As a whole it is unique and cannot rightly be identified with any other whole. To separate the particular, however, from the general case, is equally fallacious. We must learn, then, to think "general" and "particular" in one pulse, so to speak. Here the advantage of indices stands out.

Gestalt psychology faces this problem everywhere, as does any science. Indeed, the problem is universal. No two sensory experiences are identical, no two movements are exactly alike. There is no such thing as repetition or a law of repetition. But there are laws of transposition and conservation. The particular case changes and yet does not change, as in growth and evolution. That is, we are changing all the time without sacrificing our continuity or individuality. The form of the whole remains as invariant while parts come and go. Similarly, in passing from one particular to an entirely different one, of a given class, there is change and yet not change. An invariant, or class character, is preserved. Only extensional thinking is capable of handling the problem of transposition, otherwise false identity arises. Again the general and the particular, the whole and the part, must be treated together. Separation of the two results in a fatal dogmatism and a false absolutism. Nor is there any such thing as self-identity. To say that $A = A$ presupposes two A's when there is only one, and that one is changing and yet not changing. Identity, or better, the actuality of anything, can best be defined as uniqueness of membership-character of part to whole. Thus extensional thinking and the Gestalt concept of transposition have much in common.

Again, Gestalt psychology and general Semantics are one, in implying that the "part" epitomizes the "whole". Here I refer to Korzybski's happy example of the map and the territory it represents. Korzybski rightly emphasizes that the map does not include all the structural characteristics of the territory. And such inclusion would be a self-contradiction. However, I would like to supplement this point with another which, apparently, is quite as important, namely, that dynamically the part equals the whole, in the sense that any principle that applies to the one applies also to the other, and the number of principles is indeterminate. In other words, as Lucretius said, around 60 B.C., when infinity is the frame of reference, the part equals the whole. The problem can be stated more simply, as follows: degrees of complexity in nature are sheer illusions. "The atom is as complex as the universe." It is important to realize this point, for on it rests an adequate understanding of the relation between man and his environment. This simple principle leaves no room for false dualisms and dichotomies, like the old distinctions between the organic and inorganic, vital and mechanical, mental and physical, subjective and objective.

Another point, emphasized by Korzybski, which harmonizes well with the Gestalt psychology, as I see it, is that before we can use our nervous systems correctly, we must know how to use them. That is, "consciousness" is in the picture. This is another way of saying that "consciousness" is a field-property of the organism as a whole. I do not mean that "consciousness" is a discrete factor isolatable from the whole. To name "it" splits it from the whole arbitrarily and falsely. I think of consciousness as that field-property or whole property which involves processes of all kinds that we have hitherto attempted to describe by such terms as seeing, hearing, thinking, feeling, and also by such terms as heat production, nerve conduction, electrical change, osmotic,

facilitation, inhibition, colloidal reaction, change in fluidity or density, et cetera. To describe behavior in terms of colloidal reaction is to describe one, but only one, universal aspect of behavior, or semantic reaction. May I point out that the principle "no correct neural response without knowledge" corresponds to my law of determined action, that the whole conditions the activities of its parts. Remember that by "whole" is meant a particular, limited "all". A transposable structure or form, unlimited, however, is transposability.

Naturally, Gestalt psychology, as I have tried to present it, is uncompromisingly opposed to elementalism. Aristotelianism, atomism and mechanism are synonyms for the purpose of this discussion. I would like to express my admiration for Aristotle, nevertheless. He handled the part-whole problem, at the level of genius, relative to the age in which he lived. I am sure, that were he living today, he would be glad to accept the first chairmanship of the American Congress of General Semantics. He knew the importance of form (albeit he misdefined it), and, today, we are talking about individuation (differentiation), epigenesis, teleology, and part to whole subordination, quite as he did. His fatal mistake as we see it now, was in defining the whole elementistically. Unity for everyone in those days meant simplicity of structure, and has meant simplicity of structure until the dawn of relativity in the 20th century. Thomas Aquinas, Descartes, Leibnitz, Spinoza, Kant, Bradley, James, all made the same error. Today it is very difficult to prevent one's listener or reader from assuming that unity is a fixed simple quantity. The number 1, mathematically, is anything but simple. It is the "largest" and most complex number in the number range! 2, 3, 10, 1,000,000 are differentiations from 1. They are parts, fractions, whose numerators can be ignored because they are constant, 1. 1 is an infinitely expandable and shrinkable mathematical whole, or Gestalt. 1 is fixed only in virtue of transposability.

Count Korzybski's "order of observation" or "order of evaluation" finds partial expression at least, in Gestalt psychology, under the Principle of Configuration. That to which we respond is a multiplicity of stimuli. We do not respond to the unity of external systems, which are in themselves Gestalten. Direct contact between one system and another is between part and part. Nearly everyone makes the mistake at first of supposing that we respond to "patterns" and "relations". But, in responding to a multiple situation, we respond as a whole, or, in other words, construct an "object". The "object" is our contribution. I think that systems of energy everywhere, behave in the same way. The pressure of water against a dam is, directly, the bombardment of particles of water against particles of dam. This direct contact sets up, as a secondary consequence, stress lines in the field property of the dam as a whole which we call "cohesion". The stress is organic. When it reaches a critical point the dam breaks. The threshold of its "semantic reaction" has been reached, and it overly responds.

I wish that, in explaining Semantics, Korzybski would omit the expression "canalization". It smells too strongly of fiber neurology. I think that the potential difference between the animal and human brain, which Korzybski so rightly insists upon, becomes clear in terms of dynamics. The former is a less differentiated structure, and structurally more mature, and less plastic at birth. The ease with which stereotyped reactions are established can be traced to the suddenness with which neural growth reaches its limit. I doubt whether there is any canalization at all. The animal, in the conditioned-reflex experiment, simply fails to discover the difference between meat and noise, when the two are given simultaneously. False identity is lack of differentiation. Dynamically there is no switching of a specific response from one stimulus to another. In the original response to the meat, the animal responds as a whole to a total situation, and simply continues to do so after the noise is added. Then, any stimulus originally in the total situation provokes the reaction to one degree or another. Yet the principle of extensionalization can be expressed negatively as

follows, from a practical standpoint: Do not form a "conditioned reflex". It is very unfortunate that psychologists are trying to understand behavior in terms of conditioned reflexes anyway. There are no such things. Pavlov's work is of great value, salvaged by laws of dynamics, but considered as it stands, it is one of the worst exhibitions of Aristotelianism in modern times.

I heartily sympathize with Korzybski's effort to subordinate the semantic reaction to colloidal behavior. Any contribution which frees neurology from atomism is of indispensable value. But there is danger of oversimplifying the problem. I could agree that one aspect of the brain as a whole is its colloidal character, so that the problem of colloids is universal where human semantic reactions are involved. However, no universal is exclusive of other universals. Bancroft has made the mistake of trying to make density changes in colloids explain everything. Recognition of these changes can well be essential for an understanding of every behavior problem, but there is a difference between necessary and sufficient conditions. Every does not mean all. That is, every aspect of the semantic reaction may very well involve a corresponding aspect of colloidal behavior, and yet each one of those every aspects may require many other correlations before the problem is practically solved. Korzybski would agree with this, I am sure. On the other hand, Bancroft's critics are alarmed, not so much because they think his conclusions are not justified by the facts, but because his work is compelling them to change their whole pattern of thinking. The shift from fibre neurology to dynamic and chemical neurology will be bitterly contested, but the battle is won now. Facts have already won it, even if they are not by any means complete enough to be used without discretion. For the present it is not important whether Bancroft's detailed claims are true or false. The important thing is the abandonment of atomism for a dynamic, field-concept of the brain as a whole. Colloid chemistry is organismic. There is certainly great hope in this direction.

I would like here to mention a vital fact of scientific methodology that most scientists overlook (Einstein, Planck, N. R. Campbell, Ernst Mach, Claude Bernard, C. E. Guye, are exceptional). The first step in making a scientific prediction is the conception of a law so general that, to the elementarist, it seems utterly worthless, but which in reality, is indispensable at the outset, namely, a law that predicts that a given event can happen at all. To this category belong such principles as I have called the Law of Field Properties, and the Laws of Determined Action and Configuration. The second step is to predict the general direction of a process of change. This is the prediction of more than or less than. To this step belong such laws as those of Individuation, Derived Properties, Field Genesis which, as stated, are confined to step two.

Maximum and minimum laws (Least Action and Maximum Work) are available for this type of prediction but are capable of being carried a step farther. Step three then, predicts a particular quantitative change at a particular place at a particular time. Any law operating at this stage can be subsumed under principles of maxima or minima.

Finally, I have recently presented elsewhere sketches of the history of science and social trends into which General Semantics fits very beautifully. Time forbids tracing this history here, except to say that scientific scholarship has wavered in the past between an attempted organismic view of nature (300 B.C., 125 A.D., 1650, 1820, 1935) and a deliberate denial of an organic view (700 A.D., 1400, 1770, 1860). The history of science has been cyclic. This curve of history predicts a return of elementalism shortly, at the level of scholarship, coincident with a major social revolution, with civil and imperialistic war. Everything that any legitimate agency can do to minimize this expected reaction, by prolonging our present scientific enlightenment, will result that much in assuaging control of these cycles. Control of the cycles

would mean eliminating them, which, in turn, would mean a stable and peaceful society. General Semantics points the way to the education method necessary to the achievement of this end.

A TECHNIQUE FOR INTER-TRANSLATING PSYCHOLOGICAL THEORIES*

By Joseph C. Trainor
Central Washington College of Education, Ellensburg

(Condensed)

The present situation in psychology is a strange mixture of paradox, dilemma and confusion, with many self-confident schools of thought in the field, each somewhat antagonistic to the others. The history of other sciences reveals that these are the growing pains out of which there will emerge the matured science. Meanwhile, the squabbles and the confusion are here and we must do something about them.

Three possibilities present themselves: (1) Dismiss the whole argument by saying that human behavior is so varied that we can use all the theories. This is not satisfying; we cannot synthesize elements from conflicting theories and have a coherent system as the result. (2) Analyze each theory in terms of its basic postulates; utilize the known techniques of mathematical philosophy and symbolic logic and other pertinent subjects, and derive a clear-cut statement of each field or theory of human behavior. This very much needs to be done, and would reveal to the wrangling theorists the reason for their disagreements; but its limitation is that, with the superstructures removed from their theories, they would not be able to talk to one another. (3) Attempt to devise a technique of inter-translating theories as found, granting each the assumptions it requires and allowing it to manufacture the terms it chooses. A tentative device for serving the purpose of this method is here attempted.

A hierarchy of levels of structural complexity is assumed, with the following finite number of levels: 1. The sub-atomic; 2. The atomic; 3. Molecular, microscopic; 4. Macroscopically-observable point-events; 5. Descriptive names for point-events; 6. Names for groups or sequences of point-events; 7. Types of such sequences; 8. Class names for these types of sequences; 9. Types or kinds of classes; 10. Groups or patterns of classes of sequences of point-events ("elements"); 11. Types or kinds of evaluations of level 10; 12. Groups of patterns of elementalistic concepts; 13. Evaluations of level 12; 14. More-general classifications.

Terms used in the different theories characteristic of the various schools are then assigned arbitrarily SINGLE values for the argument, and in accordance with such values are assigned to positions on the assumed scale. From the theory of General Semantics we borrow the valuable observation that as we progress to the higher levels of abstraction the certainties of the concept become less and less, and, further, the range of application of the particular concept becomes less and less also. With these assumed and operational techniques we are left with a diagrammatic representation of the verbal tools of different psychologists, and our problem becomes one of translating the term used by one into the term used by another which is to be found at the same level of abstraction in the hierarchy.

The following points should be noted: (1) The hierarchy was arbitrarily chosen;

* Read at the Ellensburg Congress, 1935.

any other logically consistent hierarchy could have been chosen. (2) The scale was one-dimensional; an examination of the concepts in vogue would suggest that a multi-dimensional set of relationships should be represented to give a method of inter-translation which would have wider applicability. (3) The terms used were for the purposes of this discussion used in SINGLE-valued meanings. Actually they are multi-ordinal and infinite-valued; with many meanings and belonging on many different levels. A more general treatment allowing the terms to slide up and down the scale may be possible of construction. (4) There may be possible a general treatment of the problem involved, in terms of the mathematics of probabilities, which would yield a general technique applicable to other fields of knowledge as well.

SEMANTICS AND PRAGMATISM*

By C. E. Rugh
University of California

This paper aims merely to make some practical suggestions to educators who have discovered that we are living and must live in a new age and at the same time must live with and must work with persons who have not discovered this or are unwilling to try to face the consequences of trying to meet the new conditions.

In 1902 in the Dictionary of Philosophy and Psychology (Baldwin), President Wheeler defined semantics as follows: "The systematic discussion of the history and development of changes in the meanings of words. The value of a word at any time is determined solely by its power to convey meaning in a speech-community. What is called the etymology of a word serves only to help explain how a present meaning came to be what it is. Changes of meaning are in general brought about through the interplay of the normal and the occasional or special uses of a word. When the occasional entirely displaces the normal then the change is complete".

These statements express the common linguistic point of view and attitude. It employs the persisting superstitions that "words convey meaning" and that meaning just happens to words and must be respected. Semantics has the problem of clearing up those propositions so that they correspond to the facts or showing that they must be abandoned.

If semantics is to become a science in the modern sense, it has other obligations than treating the history of the changes of meanings. Two such additional duties are evident: (1) it must invent accurate and adequate ways and means of creating new meanings for old terms, and (2) of creating new terms for radically new meanings. This paper aims to suggest a pragmatic way of performing this first obligation. Because of the very nature of language, these new meanings must be distinguished from the former meanings. To do this the following technology has been used in Theory of Education.

Suggestions for Creating a Glossary for the Theory of Education

I Etymology and other historical facts.

President Wheeler says, "What is called the etymology of a word serves only to

* Read at the Ellensburg Congress, 1935.

help explain how a present meaning came to be what it is". The term "Pragmatism" will be used both as an example and as a technology.

II The Second procedure is to set forth current definitions.

The educators need to know: (1) The literary definition as set forth in a standard dictionary. (2) They need to know also the philosophical formula where available. (3) Then there are authorities in Education that have formulated definitions. (4) There are in addition specialists that have created useful formulations.

Definitions.

1. Century or Standard Dictionary.
2. Dictionary of Philosophy and Psychology, Baldwin, 1902.
3. Cyclopaedia of Education, Monroe, 1911-1913.
4. Encyclopaedia of Religion and Ethics, Hastings, 1910-1927. There is an excellent index to this work.
- 5., 6., 7. Other authoritative definitions available.

III The third procedure is a statement of preference among the definitions given, with reasons for this preference.

Other notes concerning the term and meanings with a personal formulation if so desired.

This technology is exemplified with the term "Pragmatism" and then the method proposed by pragmatism is suggested as an essential part of semantics as scientific.

Pragmatism

I Etymology - Gr. pragmatikos active, versed in affairs.

In the Kantian philosophy, practical in a particular way--namely, having reference to happiness.

In the Fundamental Principles of Morals Kant gives three Imperatives: technical, pragmatic, and moral, and then gives the following footnote: "It seems to me that the proper signification of the word pragmatic may be most accurately defined in this way. For Sanctions (See Cr. of Pract. Reas., p. 271) are called pragmatic which flow properly, not from the law of states as necessary enactments, but from precautions for the general welfare. A history is composed pragmatically when it teaches prudence, i.e. instructs the world how it can provide for its interests better or at least as well as the men of former times."

II Definitions

1. Century Dictionary:

Pragmatical character or conduct; officiousness; busy impertinence. See pragmatic A. - Relating to civil affairs.

2. Dictionary of Philosophy and Psychology:

"The opinion that metaphysics is to be largely cleared up by the application of the following maxim for attaining clearness of apprehension: 'Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object'." - C.S.P. (Peirce) 1902.

3. Cyclopaedia of Education:

"The gist of the notion is that the meaning of any idea or conception lies in the consequences that flow from an existence having the meaning in question, so that the way to get a clear conception is to consider the differences that would be made if the idea were true or valid." - J. D. (Dewey).

4. Encyclopaedia of Religion and Ethics:

"Pragmatism has come into use since 1898, when the word first occurred in William James's pamphlet on Philosophical Conceptions and Practical Results, as the technical name for a tendency which can be traced throughout the history of philosophy, but has only of late grown self-conscious, systematic, and general. The term had been coined twenty years before by C. S. Peirce (without regard to the existing, but obsolescent, word 'pragmatic') in order to express the scientific need of testing the meaning and value of our conceptions and terms by their use, i.e. by applying them to the things which they were supposed to stand for, instead of allowing their own apparent self-evidence or intuitive certainty to attest their truth without more ado." - F. C. S. Schiller.

5. C. S. Peirce--Lecture in Pragmatism at Cambridge, Mass., March 26, 1903.

"Pragmatism is the principle that every theoretical judgment expressible in a sentence in the indicative mood is a confused form of thought whose only meaning, if it has any, lies in its tendency to enforce a corresponding practical maxim expressible as a conditional sentence having its apodosis in the imperative mood."

6. "The pragmatist or instrumentalist insists that ideas are immanent agents, dynamic instruments, in the making and remaking of experience. The function of ideas is not to copy or represent particular things, nor is it the function of truth to be an 'ideally' harmonious or coherent mental replica of reality. Indeed the pragmatist thinks that, since reality is muddy, incoherent and ever flowing, true ideas can never be parts of one coherent timeless whole of truth." - (Man and the Cosmos, J. A. Leighton. Appleton, 1922, p. 55.)

7. "The pragmatic method is a technique for solving human problems, and this method may be applied as rigorously to the values of life as in scientific procedure." - (National Encyclopedia, Vol. 8, p. 209.)

III The third procedure is to make a preference from among the formulations if possible or to construct or create a new formulation for personal use.

In some cases the third movement consists in comments upon similarities or contrasts between the formulations.

Personally I am in the habit of following Peirce in the suggestion to translate the indicative theoretical judgment into an imperative proposal.

Students in Theory of Education have treated some two hundred terms by this method and the results have been most gratifying. The best students profess to have changed their whole philosophy of life, education and language. A word or a term has no meaning apart from a context and the normal context is a proposition. The word "House" in reality means nothing. In the proposition: "Colonel House was an advisor to President Wilson", the term is a so-called proper noun. In the Proposition: "House the soldiers in the tents", the term is a verb. In the proposition: "They have launched a campaign against the house fly" the term is an adjective.

Semantics and pragmatism are no longer satisfied with the grammatical account of

the functions and uses of terms. It is not enough to suggest the object or reality to which a term points. Pragmatic Semantics must help in getting the experiences that make language and reality similar in structure.

EDUCATION AND THE MODERN WORLD*

By Joseph Brewer
President, Olivet College, Olivet, Mich.

A public address these days is scarcely respectable unless it announces in ominous tones that we live in a changing world. And the statement is doubly platitudinous because of course men have always lived in a world whose principal characteristic is change. If the rate of change has seemed accelerated in our day, this is probably due to the multiplicity of inventions which have facilitated rapid communication--telephones, automobiles, aeroplanes, radio, etc., etc. These mechanical devices have in fact materially altered the surface of human living. But we have, on the whole, adapted ourselves fairly readily to them.

Few of those speakers, however, who talk to us about the difficulties of adjustment seem to be fully aware of the profundity of the changes which have taken place in our human world during the last thirty or forty years. Fundamental changes have gone on in the basic processes of our "thinking" and these are only just beginning to affect, and to affect profoundly, our everyday lives. As our understanding of the structure of the world both outside and inside our skins has grown, re-orientations in our ways of "thinking" such as have not taken place for nearly three thousand years have become necessary--necessary if we are to make use of the vast possibilities for human happiness which this world contains, necessary actually for human sanity.

Up until thirty or forty years ago it had been possible to describe and account for everything we had so far observed in the universe, including man himself, in terms of Aristotle's theory of knowledge. All the mechanisms of which we were aware could be interpreted within the bounds of this great man's logical formulations. (I use the term mechanisms in the sense of natural processes--not man-made machines.) But finally our means of observation were sufficiently refined to permit our discovery of structures and processes which could not be explained on the basis of Aristotle's logic, or more specifically, in terms of Euclidean geometry or Newtonian mechanics. It became necessary, therefore, to invent new formulations, more highly generalized than these older systems, and such a process is now going on. We have already seen the development of several non-Euclidean geometries, the quantum mechanics, Einstein's Relativity and unified field theories, etc., etc. in the realm of mathematics and physics. In fact, the very foundations of mathematics have been revolutionized in our day. But this is not all, for similar events are taking place in all fields. For instance, the structure and behavior of colloids cannot be described and accounted for on the basis of the older formulations, and the postulates and procedures of psycho-analysis and modern psychiatry are also outside the bounds of Aristotle.

Now, important as these speculations may be for the scientist, many will complain that they seem remote from our everyday doings and undergoings. Yet that is farthest

* Address delivered at the opening Convocation of Olivet College, Sept. 20, 1937. Reproduced, by permission of the author, from the College Bulletin, vol. 37, no. 1 (1937), with certain omissions.

from the truth, for the implications in these higher abstractions for our so-called "practical" affairs are tremendous, although applications of them are only just beginning to be made. The modern automobile and aeroplane, radio, motion-pictures, television and hundreds of the common objects and devices of our environment, as well as much of modern medical and surgical treatment, etc. would not have been possible under the older formulations. If we are to adjust ourselves satisfactorily to a world which includes such things we shall have to learn to use the types of "thinking" involved in these new non-Aristotelian orientations. For it is not "the war" or "the movies" or some other symptom, which is responsible for the confusion of values so obvious in our 1937 world, for the tremendous increase in so-called "mental illness", crime, war, poverty, and human misery in general, but precisely the failure to make the adjustment in our "thinking" that is required for living in a world now functioning in these new terms.

The confusion is evident. It can be seen all about us. It is clearly reflected in much of our art and literature. The need for a new psychology, a new general theory of value is obvious and the call for it can be heard on every side. Such books as Dr. Alexis Carrel's Man, the Unknown make it very clear. Happily, however, the application of some of these newer ways of "thinking" is gradually being made to human affairs. Recently, moreover, a general formulation based on what for lack of a better term we have had to call a non-Aristotelian orientation has appeared in the General Semantics of Count Alfred Korzybski. Mr. Stuart Chase, in his new book The Tyranny of Words discusses at length the approach and the implications of this new formulation as embodied in Korzybski's own work Science and Sanity. The term "semantics" is derived from the Greek semantikos, "significant", from semainein, "to signify", "to mean", and has been widely used in various restricted contexts. As the term "General Semantics" implies, Korzybski uses it in its widest sense to indicate the reaction of the human organism-as-a-whole, the significance, the meaning by which we evaluate our experiences.

Now in education the need for a workable theory of value, a general integrative principle has become acute and the search for it has been widely publicized of recent years. Much of the discussion of "integration" to which we have been exposed, however, has had to do with the superficialities of the curriculum rather than with human beings. But even this has served to indicate a real need and recently some more thoroughgoing proposals have been made for bringing order out of our all-too-potent educational chaos.

The issues have supposedly been fairly sharply drawn. In one camp stand the representatives of the Humanist Tradition with Dr. Hutchins, the President of the University of Chicago, at the head. In the other, stand the representatives of the Scientific Tradition. The cry of the Humanists, greatly simplified, seems to be "Back to Aristotle", or at least to Metaphysics and the Classics. A classic, it should be said parenthetically, is defined as a work which has permanent value, which would be great in any age. The cry of the Scientists, who of course derived originally from the Humanist Tradition, seems to be "Away with the Past, Away with Metaphysics. We live in the present and only the methods of scientific research can save us." The Humanists cry chaos, instability and lack of principle at the Scientists. The Scientists cry authoritarianism, obscurantism and ostrich at the Humanists. The sensible man, as the 18th century might have said, inclines to cry, "A plague of both your houses."

But of course that is not good enough. On closer inspection one inclines to suspect that the Humanists are perhaps insufficiently aware of what has been going on in science or they would not attempt to force a non-Euclidean, non-Newtonian world into the outgrown pattern of the Aristotelian-Thomist tradition. For it is a sad mistake to think that we can go back to these earlier designs. And yet the desire for a con-

scious metaphysical basis for education, for a clearly articulated structure of values is entirely reasonable. Nor should we neglect the classics of our culture. We stand on our ancestors' shoulders. Man is a "time-binding" class of beings, to use Korzybski's phrase. Man alone has invented extra-neurological means of preserving his knowledge. It is this which has produced civilization, and to be "civilized" and "cultured" human beings we need to be acquainted with the monuments of our civilization and culture.

Apart from the great pleasure that reading the classics gives us and the standards for aesthetic taste which they provide us, we need to know, to interpret, and so to understand in principle the successive stages by which we have arrived at our present state if only that we may avoid the mistakes of the past. This too often the scientist, or perhaps it would be wiser to say the pseudo, or superficial scientist, forgets or neglects when he wishes to dispose of the past. We need to study men and their activities in all ages, men as poets and artists as well as scientists, warriors, politicians, etc., if our understanding of ourselves is to increase. Too often also, your pseudo-scientist, of which the world is full, is unaware of the metaphysical basis of his own work, of the underlying assumptions and undefined terms upon which his whole structure of generalization and methods rests. Only through consciousness of these fundamentals is it possible to gain any measure of control over experimentation or to achieve any predictability of results. In education these things have been often neglected and thus confusion has been worse confounded. Moreover, your pseudo-scientist too frequently is satisfied to produce his generalizations in a special field without going on to apply them to wider human affairs and so he lays himself open to the Humanist charges of isolation and sterility.

Of course your true scientist and your thorough-going Humanist can have no real quarrel. Their approach to the world differs, but their aim is similar. Only of late they have both lacked the general formulation, the epistemology which could bring them together.

In General Semantics we have the basis for such a formulation. Founded on rigorous scientific method using standard knowledge provided by the diverse branches of scientific enquiry, General Semantics represents a natural order of evaluation which can once more provide us with a direction, an Ariadne's thread for our 1937 maze. It might well take its place as the inheritor of the great Humanist Tradition, taking all knowledge including science to be its province and from which nothing that is human is considered alien.

Primitive religion in its attempts to account for the observed ways of the world, including man, was the beginning of our organized knowledge. Increasing observation, control and understanding of the structure of the world finally produced the conditions in which Aristotle's systematic formulation was possible. In the development of our culture since then, two main lines of approach can be broadly traced; if you like, the extrovert and the introvert, the objective and the subjective. In later times, these two attitudes have been influentially represented by Hobbes and Rousseau, one standing roughly for "reason", for "classicism", the other for "intuition", for "romanticism". If one were to make use of the formula of the Hegelian dialectic, one might say in rough description that Hobbes represents thesis, Rousseau antithesis and now General Semantics appears as synthesis.

With its basic metaphysics clearly stated, General Semantics is founded on a set of negative premises, since paradoxically enough, these constitute the only positive knowledge we possess. Moreover, its undefined terms are clearly labelled as such. Starting from this foundation, it proceeds by rigorous scientific method to investigate man as an organism functioning continuously as a whole in space-time. In the course of

the investigation it appears that man's language function is of paramount importance for his happiness since it affects directly the functioning of his nervous system and hence his adjustment to the world outside his skin, including other human beings. Unless his verbal and symbolical structures, which can actually alter the constitution of the colloids in his nervous system, are similar to the structure of the world in which he lives, he is like a man trying to find his way in unknown territory by means of a map of some other country. His "knowledge" is false to the facts about him and he lives in a world of confusion if not of illusion. Moreover, the further reaches of this difficulty are delusion, hallucination and insanity.

Out of this investigation of man's language function (in which of course mathematics appears as a language structurally the most accurate we have because most nearly similar in structure to the universe) comes the discovery that there is a natural, normal order for the functioning of the human nervous system determined by the structure of the nervous system itself. This establishes inevitably a natural order of evaluation. Evaluation implies morality and so we come full circle and touch all of man's activities, including literature, art, science, politics, economics, religion, etc. And perhaps it should be stated that General Semantics has no quarrel with religion as such. Here indeed the old pseudo-struggle, the misunderstanding between science and religion is resolved. Against the primitivistic elements of formal religion, General Semantics does take a definite stand since it regards these as outworn structures, delusional in the light of 1937 knowledge and so inevitably generators of insanity. It regards, too, the hortatory method of promoting morality as ineffective since it consists mainly of talking about symptoms rather than doing something to affect the underlying mechanisms. But by a proper allocation of symbols it can assign a definite functional value to the basic intuitive impulses, motives and attitudes of religion as a human activity.

General Semantics, however, does not merely present us with a general theory of values, but it also provides us with what may be called a technique for sanity, an educational instrument of the greatest value and of proven effect, which can be used either with individuals or for mass training at all levels and all ages. In the last few years an impressive amount of experimentation and clinical work has been done in semantic training not only of so-called normal human beings but also of persons in advanced psychotic states. The results have been universally predictable and uniform. It will suffice perhaps to point out that the psychiatric work of the University of Chicago Health Service is being conducted entirely on the basis of General Semantics with notable effect, and that an increasing number of institutions for the mentally ill are making use of its methods with equally impressive results.

While the use of General Semantics as a therapeutic technique is significant, perhaps its most important possibilities lie in the field of education not only for "straight thinking" and for the prevention of mental illness but for the general facilitation of the learning process, for increasing mental efficiency and as a method for clarifying, refining and increasing human knowledge. Many valuable and interesting experiments with its uses in this field have been conducted in recent years and others are under way now in different parts of the country. It will suffice perhaps to mention only one or two to indicate what is being done, what is being accomplished. The further this work goes the greater the possibilities seem. They are unfolding continually before us.

In 1934 and 1935 at the Washington State Normal School in Ellensburg, Washington, experiments in Semantic training were conducted with groups of thirty sophomores over periods of six weeks. Even after this brief training quite astonishing results appeared. Control groups closely approximating the experimental groups were used and the Detroit

Intelligence Test, Advanced Form, was administered before and after training. In one case the mean score of the experimental group advanced from 128 before training to 159 after training, a gain from the 45th percentile to above the 90th percentile of the national norms. In another case, the mean score of the experimental group advanced 36 points to the control group's 6, a gain from the 62nd percentile to the 95th percentile of the national norms. Moreover, there was a reduction of emotional maladjustment in the experimental groups as measured by the Frensey X-O Tests.

Similarly striking results have been achieved in the course of the last two years in the Harstow School in Kansas City, where, after a course of training for the whole faculty of the school to insure a general Semantic orientation throughout the school, specific General Language courses were organized for eighth grade and tenth grade students in which the language function and the function of language were both investigated and training in General Semantics was introduced. The effects of this work have been felt throughout the school with a marked advance in the quality of scholarship quite evident as well as a heightening of interest, a better adjustment to living and a general "toning up" of the whole institution.

Examples could be multiplied from the Williams Institute in Berkeley, California and elsewhere. In individual cases the beneficial results of the Semantic training conducted by Count Korzybski during several visits to Olivet have been observed here in the College. With the impressive and mounting body of evidence pointing to the effectiveness of the technique of General Semantics, we should be failing in our educational duty if we did not try to make use of this new instrument for the advantage of the students in our charge as rapidly and effectively as possible. Consequently, we are attempting this year to make as solid a beginning as we can and we shall hope to extend the work as rapidly as we can see our way clear to do so.*

Through the basic orientation of General Semantics the College, it is hoped, will be able to present a better integrated education program to its students. It will, we hope, derive the strength, direction and vitality which come from a clearly perceived theory of value. It will also, we trust, find new and richer meaning in the Great Tradition of human learning. More than all, we hope that it will be enabled thereby the more effectively to help its students make the most rather than the least of the possibilities that lie almost untapped in human nature.

EXPERIMENTAL RESULTS OF TRAINING IN GENERAL SEMANTICS UPON INTELLIGENCE-TEST SCORES*

By Joseph C. Trainor
Central Washington College of Education, Ellensburg

The theory of General Semantics in its present (1935) form is essentially that there exists in the human nervous system a general mechanism, somewhat similar in nature of concept to that type of functioning which we have been calling vaguely, intelligence. In distinction, however, to the commonly held views on intelligence, General Semantics implies that this mechanism is exceedingly amenable to environmental influences; that it may, in other words, show marked effects of training in Semantic methods.

In the book "Science and Sanity" the foregoing thesis is put forward in verbal

* A passage here omitted summarizes the general procedure planned.

* Read at the Ellensburg Congress, 1935.

and theoretical form, and it becomes exceedingly pertinent to the science of General Semantics, as well as to our general theories of mentality and its functioning, to experimentally determine whether or not training in Semantic methods brings about any significant modification of performances that are generally accepted as criteria for measuring intelligence.

To this end a group of thirty sophomores in the Washington State Normal School at Ellensburg, Washington, were given the Detroit Intelligence Test, Advanced form; then submitted to six weeks of training in Semantic methods, and then retested.

The method of training was essentially as outlined in Chapter 29 of "Science and Sanity" and consisted of the following projects:

1. A deliberate attempt, by means of illustrations used by the students empirically, to eliminate the attitude of "all-ness" which characterized their responses ordinarily. Examples were taken first from the field of inanimate nature and later from the behavior examples of themselves and of other people. The students were required to list the characteristics of events placed under consideration and then were shown that there was always some characteristic unmentioned. Eventually the awareness of the necessity of "non-allness" as an attitude and point of view emerged and the application to further problems seemed almost automatic and immediate.

2. Growing out of the first technique or attitude came that which is called by Korzybski the "Consciousness of Abstracting". This is essentially a business of building up in the student an awareness of the fact that characteristics of events are always left out whenever he has an experience, and that further characteristics of the experience are left out whenever verbal activity is employed by the individual.

3. Thirdly, the significance of the Einsteinian conception of the physical world for the recognition of the necessity of different points of view was introduced. Examples of the difference of experiencing an event from one position or another were given. To illustrate the psychological fundamental of the individual's experiences being unique, the illustration of a city map, assigning one and only one individual to each street corner, was used.

4. At this point the Structural Differential was introduced for the purpose of having the foregoing points visually and manually experienced. Definite drill in its use was given, and class questions and discussions were conducted with the aid of the Differential from this point on.

5. Next there was an attempt to eliminate from the thinking of these students the use of the "is of identity". This seemed to be most difficult, as the habit is deeply embedded in their reaction patterns, but insistence on the substitution of some functional term that expressed a relation of different form rather than the false-to-facts relation of identity, resulted in some progress toward the elimination of this vicious habit.

6. At this point the students were introduced to a neurological diagram that bears a one-to-one relation to the Structural Differential. (It came to be labelled "Qawaid"). The use of both diagrams seemed most valuable, and served to introduce one of the most important facts discovered by the Science of General Semantics--namely, that there is a natural, normal order for the functioning of the human nervous system. By this is meant that first things must come first, and second things second, etc., etc., and that the order in which the events in the nervous system are to occur if natural functioning is to be brought about, is determined by the structure of the human nervous system itself. This notion of order in the nervous system yields us a new "psycho-logic" in

the place of the old psychology, and its significance becomes the more apparent when we realize that the tremendous growth and advance of modern physics has come since the concept of order was introduced into the languages which were used to describe the phenomena encountered. Definite drill in the functioning of the nervous system in a healthy order was given.

7. Practice in silence at the Objective Level is a most difficult thing to conduct, largely as a result of our habituated tendency to talk about our experiences as soon as we have had them, and to spend most of our living with the words rather than with the experiences. The significance of the habit of delaying the verbal response, and the point that this could be most easily brought about by eliminating for certain periods of the day the use of verbal activity entirely, were emphasized. In the use of the Differential, silence and pointing were insisted upon whenever the objective or non-verbal level of experience was indicated.

8. Lastly there was definite drill given in the use of description along with inference. Students were checked whenever they inferred without giving first the descriptions upon which their inferences were based. Usually it was evident to the student that when the descriptive facts were before him, the inference invariably contained some amount of uncertainty. This habit seemed to be assimilated by the students quite readily.

Such, in brief, was the nature of the training employed. For a further elaboration of these points, I refer you to the book itself--"Science and Sanity", Chapter 29.

RESULTS:

	<u>Before Training</u>		<u>After Training</u>	
	Mean	Median	Mean	Median
Experimental group	137	138	173	191
Control group	136	133	142	139

Considering first the Means, the control group gained 6 points while the experimental group gained 36 points. This represents a change for the experimental group that is significantly greater than that for the control group.

If we use the medians as the criterion of modification, the gain for the control group is 5 points, while for the experimental group it is 43 points, again a significant difference.

Using the medians for the experimental group, the change brought about in this symbol was a move from the sixty-second percentile of the national norms for the test to the ninety-sixth percentile.

INTERPRETATION OF RESULTS.

It is impossible in an experiment as limited in scope as this, or with so many factors unmeasured, to give a highly detailed explanation of the results obtained in the usual cause-and-effect formula. To attempt to do so would be to flirt with delusion. But certain it would seem that training in General Semantics is one of the factors contributory to an increase in the efficiency of performance on Intelligence tests, if this one be typical, and its wide use would seem to indicate that it is so typical. In other words, we can with some definiteness state, remaining at the descriptive level for the moment, that a group semantically trained will yield an increase in performance significantly greater than the increase yielded by a group not so trained.

The complicated problems and question as to just exactly how this change was

brought about, as to the permanence of it, and the like, are left unanswered for some further and more elaborate investigation.

Underlying the whole problem has been the question of the intelligence test itself. Whatever is invalid in intelligence-test procedure enters into the experiment herein reported, but as this is the present best method of measuring those mental processes which we choose to classify and characterize as "intelligence" the use of such a test was imperative.

The results would seem to indicate an experimental endorsement of the claim of Korzybski that it is possible to re-make mental patterns and that the great realm of "dumb-bells" may be such because of an imposed matrix of thinking, rather than because of some Calvinistic heritage. The answer to the doubt that mental efficiency can be much modified at all would seem to be clear and concise. Mental efficiency was modified.

SUMMARY

Subjects: Sophomore class in Beginning Psychology, 30 in number.

Method: Specific drill in use of educational principles as given by A. Korzybski in "Science and Sanity", chapter 29 (On Non-Aristotelian Training). Revision of material of course and presentation of psychology from the non-elementalistic point of view.

RESULTS: Objective--Reduction of emotional maladjustment as measured by the Pressey X-C Tests. Median of class was 18 on test I, and 37 on test III. The national norms yield medians of 41 and 73 respectively. Median score on Detroit Intelligence Test (Advanced) was 128 before training and 139 after training.

Effects on Classwork:

Class discussions were greatly improved through the elimination of blind alleys of a verbal nature. The quality of examination papers was greatly improved and what might be called "clear" thinking became the rule rather than the exception. The material of the course was assimilated with less effort on the part of the students. Dull students were most profoundly affected: one boy whose grade-point average had kept him on the academic danger-line every term in school showed a grade-point average above the median of the school for the term in which training was given.

Effect upon social adjustments:

Students reported the following applications of the principles by themselves to the solution of their problems: (1) Three cases of inferiority maladjustment were recorded, one of them serious. They were solved by the students concerned through the application of the principles. (2) The elimination of "gossip" tendencies was an immediate application by some students and they reported an increased ability to appreciate and enjoy their acquaintances with others. (3) One case of adjustment to "boss" in charge of work by eliminating an unfounded prejudice with regard to him. (4) Many cases of minor adjustments and definite reports of satisfaction coming through the feeling of getting one's thinking under control.

CONCLUSIONS: It would seem that training in the principles yields some beneficial modi-

fiction of reactions. These modifications are in all probability brought about through the operation of many and complex factors, including the training. Most important would seem to be the rapidity and ease of solution of social maladjustment of a sort common to the normal individual. Further and extensive research is imperative and its advisability would seem to be indicated by the results given.

SOME RESULTS OF EXTENSIONAL TRAINING OF "MENTALLY RETARDED" CHILDREN *

By Harold M. Potts
Olympia Public Schools, Olympia, Washington

This paper reports the use of the direct neurological method with 'mentally retarded' children from a psycho-physiological standpoint, as outlined by Alfred Korzybski in his book Science and Sanity, and its application to the curriculum (1935).

About a year ago I became interested in the work of Korzybski and his theory of scientific procedure for pure thinking by direct neurological methods. (Chapter XXIX, Science and Sanity). The psycho-physiological aspect of the work seemed to be a method scientifically sound, according to the best authorities in the field of modern biology, neurology, psychiatry, zoology and physiology, as well as many other noted scientists in the field of mathematics, physics, anthropology, etc. I then decided to apply the principles of Korzybski's theory in working out a procedure with a group of mentally retarded children ranging in age from twelve to seventeen. The experiment with this method has been applied thus far with only one group, which consists of 17 boys and seven girls whose I.Q.'s range from 80 to 86, the rating being taken from the Binet-Simon Individual test. The group as a whole were 'socially' as well as 'mentally' maladjusted.

As I was unable to teach the class (being in an administrative and supervisory position), it became necessary to train a teacher as well as I could to carry out the training. Fortunately I had a teacher who one might say was a 'natural Non-Aristotelian' in his 'thinking'; and after carefully studying Science and Sanity, he enthusiastically entered into the work of outlining a classroom procedure with me and the carrying out of the plan. This included the revision of the entire course of study, so that the course grows from the students' own abstractions and observations.

The work is now in the early experimental stage and the time of experiment has been but seven actual months of training with a vacation interval between; also, only one group has been included in the work.

Thus this report will no doubt be criticized as lacking scientific background and containing opinion rather than experimental data. (I hope to have, in the not too distant future, some data that may be backed up by experimental methods acceptable to educators in general). However, any report on this type of training would differ from traditional reports on educational experiments because the results in training in General Semantics are general and automatic and are of a standard character in that we are not endeavoring to train the pupils for any specific objectives, the aim of our work being, to habituate the neurological mechanism to function in 'extensional thinking' habits rather than 'intensional'. We are also endeavoring through our curriculum,

* The material in this paper was presented (in another form) at the Ellensburg Congress, 1935.

which is a 'functional' part of the training, to help close the gap between "cultural lag" and the actual scientific world in which we find ourselves in 1936.

METHOD OF PROCEDURE IN TRAINING PUPILS

My aim in teaching is to follow the theories of Korzybski, who expresses one of his major premisses (pag 403, Science and Sanity) as follows: "The present Non-Aristotelian system is not only based upon complete rejection of the 'is of identity' but every important term which has been introduced, as well as the 'structural differential', is aimed at the elimination of these relics of the animal."

The technique employed, involving the elimination of 'identification', 'allness', the reversal of the pathological reversed intensional order, etc., is given in detail in Chapter XXIX, Science and Sanity. However, I shall illustrate one lesson as given in the class. (This training was given from one-half hour to an hour daily for four months and then but once every two weeks, i.e. the practice in abstracting for training in conscious abstracting, which we hope will grow into unconscious consciousness of abstracting.)

A typical example of classroom procedure in abstracting is as follows:

The teacher writes upon the blackboard the word rain, as a symbol of an event taking place outside at the time and under observation of the children in the class. They are then asked to tell all that they know about rain. The pupils begin their replies and these words are placed upon the blackboard by the teacher in columns corresponding to their multi-ordinal arrangement. (See diagram). With the majority of the mentally retarded pupils the abstractions are of the lower order and of the descriptive type. Some however get into the little-higher levels, as one sees in the abstractions given. The teacher continues asking if that is all there is to know about rain until the subjects become visibly disturbed and have reached a mental impasse. At this point they become agitated, and the teacher writes under the horizontal line of the diagram the word unknown but still continues to listen to any new suggestions.

The following personal reactions were noted at this point: Norman pulled at his hair and kept saying over and over, "What is water?" Billy argued that water was moisture and when questioned as to what moisture was replied that it was water; he then came to a complete blockage or suspension of further reacting. Earl cried out, "Let's get the dictionary." Stancel remembered suddenly as though inspired that water had something to do with chemicals.

ABSTRACTIONS ABOUT RAIN

Origin	Structural Differences	Health, Food	'Good'	Uses	
					'Bad'
Clouds	Wet like snow.	Crops	Rivers		Slides
Steam	Fog and mist are damp	Drink	Creek		Slippery
Ocean	like rain.	Wells	Lakes		pavement
	Different from snow	Irrigate	Power		Glaciers
	in that rain is not	Springs	Fishing		Muddy
	frozen.	Ice	Electricity		Makes roof
	Hail, snow, and rain	Softens ground	Bays		leak
	began as a vapor.	Artesian wells	Ocean		Darkens
	Both come from clouds.	Dish water	Swamps		the day
		Wash hair			
		Known			

Water (What is it?)
Chemicals
'Etc.'

Unknown

They had now reached a complete blockage and no further reactions were given. They all decided that there was much more to rain than mere falling water from the sky, that there was a great deal that was unknown. They voluntarily asked to learn more about water and about chemicals.

The teacher gained a more concrete knowledge of what the pupils knew in direct and concomitant learning. The diverse bits of knowledge gave the pupils a new attitude toward the subject; in other words, the identity of rain as mere falling water was eliminated and the feeling of the infinite number of aspects of rain took its place. The children's minds consciously attempted to connect the seen and the unseen; (known and unknown) similarities and differences. The class began to see the infinite nature of an object.

The curriculum method adopted facilitates in a practical way the method of abstracting mentioned previously, by means of centers of interest (events). Five of man's basic needs are on the sensory experience levels or objective level. These are: (1) Nourishment (I am hungry); (2) Protection from bad conditions (I am cold); (3) Protection from enemies (I need to protect myself from natural environmental enemies); (4) Work (I need to work); (5) Recreation (I like to play, read, etc.)

Through the medium of reading, writing, social studies, arithmetic, vocational studies, science and dictation, the multi-ordinal terms about rain may be practically studied with relation to man's basic needs. All through this practical application the teacher attempts to have the children consciously abstract, emphasizing the differential part of the abstracting process.

RESULTS OF TRAINING

1. Interest in work improved in a few days.
2. Intensional blockages, which otherwise would not be noticed, began to appear spontaneously, to become eliminated by the pupils themselves, by the use of extensional methods and language.
3. Verbal expressions, which before had been halting and ambiguous, became more spontaneous and clear.
4. The children became more serious toward their school and their school work, showing a better application at their tasks, together with seeing the place in the scheme of things of the school as a whole.
5. The method seems to impress them almost immediately, tending to enhance interest and sound curiosity, eliminating feelings of inferiority, hopelessness, inertia, etc., and this is reflected in the general orientations of the pupils.
6. Restlessness, etc., due probably to some extent to their incapability of solving their own problems by intensional methods and language, disappear and marked calmness, hopefulness, careful self-reliance, etc., make their appearance.
7. The value of knowing that an event has extensionally an infinite number of characteristics, from which our nervous system abstracts only the object, has an unconscious effect upon the pupils over a period of time. It has been eight months since this method was first applied and at the present time when a new center of interest is started they consciously try to discover or explore the many-sided (infinite-valued) aspects of any event without overt urging.
8. They do not feel inferior to others, because they know that, although some know more about an object or a situation than they do, nevertheless no one knows 'all' about the simplest things, and they enjoy field trips and experiments to discover new data.
9. Korzybski expresses it very well on p. 329 of Science and Sanity: 'One of the benefits of the present method of training in sanity consists in the fact that we do not dwell upon the personal affairs of the individual, but that we give, instead, a

general structural semantic method, by the aid of which every one can solve his problems by himself.'

10. Most-noticeable and highly desirable results came about in changed social attitudes and adjustment to school.

CONCLUSIONS

The curriculum adopted trains in extensional conscious abstracting, and in turn this training in abstracting opens up a new world to be found through the studies and the drill in schools. The efficiency of learning and teaching becomes much enhanced, placing education in a new, higher, and appropriate position.

The results of training in the methods of General Semantics, some of them not to be measured by the older tests, were such that I propose to continue the drill in this new extensional neurological method, and extend it to classes of 'normal' children.

LANGUAGE RE-ORIENTATION OF HIGH-SCHOOL CURRICULUM AND SCIENTIFIC CONTROL OF NEURO-LINGUISTIC MECHANISMS FOR BETTER MENTAL HEALTH AND SCHOLASTIC ACHIEVEMENT*

By M. M. Kendig

Principal and Educational Director (1934-1936)

The Horstow School, Kansas City, Missouri

(Executive Secretary, Institute of General Semantics, Chicago)

This paper sets forth a new orientation and unique attack on the problem of how to improve the results of secondary education in terms of optimum 'Mental Health' (life adjustments) and scholastic achievements. It is our thesis that the fundamental factors of this problem are not touched by the present guidance programs and the obviously desirable and necessary changes in curriculum and procedures which aim to bring the sense of life reality into school situations. This new orientation centers on the recognition and possibility of automatic conscious control of the basic mechanisms of human behavior which are peculiar to human nervous systems, namely the neuro-linguistic and neuro-semantic mechanisms.

Modern science discloses these mechanisms quite clearly. We can only summarize the facts and interpretations in the following paragraphs. The nervous system consists not only of 'fibres', 'neurons', etc., static anatomical structures, fictitious in a living organism, but represents a functional complex which operates as-a-whole. Its working mechanisms represent colloido-quantum dynamic configurations in endlessly variable states of dispersion or agglutination, in connection with electrical manifestations. Psychogalvanic experiments have shown that words and in general the language-function involve self-generated electrical manifestations. Electro-encephalograms disclose that all psychological manifestations involve electrical brain-waves different in animals and men, and differing between individuals, sexes, etc., and even that trains of regular waves of a particular character could be produced when certain sounds were made. (1)

* Paper presented before Section Q, American Association for Advancement of Science, St. Louis, Missouri, December 31, 1935. Reproduced by permission of the author.

(1) See Science, 81: 537, 1935, and 82: 198, 1935.

Under such colloido-electrical conditions and the findings of psychiatry, and psychiatrical colloidal data, this new and scientific orientation becomes imperative. (2) This involves removing education from metaphysical speculations and unscientific personal opinions, and treating education as a natural experimental science which co-ordinates the results of related sciences, as they contribute to the knowledge understanding and control of the mechanisms which govern human semantic reactions. Semantic reactions are defined as 'evaluating reactions', which obviously are non-elementalistic as they involve 'intellect' as well as 'emotions'.

According to our interpretation, the above-mentioned colloidal electrical experiments have demonstrated that linguistic issues are connected with 'thought', and semantic reactions, and influence behavior, in hitherto unnoticed ways. Linguistic issues, then, require special treatment as physico-chemical environmental factors actively conditioning human attitudes (orientations) and 'mental-emotional-physical' adjustment and development from babyhood on. The language-function thus becomes the important focal point in our view of school work.

The educational program which we are formulating and attempting to develop at The Berarow School, Kansas City, is built around the language-function in all twelve grades, though this paper deals with the language re-orientation of the high-school curriculum and the new curriculum of the eighth grade which becomes a general language course in preparation for the high school. Though seldom stated, and I believe never before stated in a workable formulation, language is obviously the common denominator (or base) of all school subject-matters, mathematics and science included, as it is of human life.

This basic role of language has received partial recognition in the present increased emphasis on 'improving students' reading and writing since the discovery of the high correlation of scholastic failure with deficiencies in these skills. Our analysis deepens and sharpens the problem. 'Emotional' maladjustments are usually associated with reading disabilities. We treat both as symptomatic of disturbances of the neuro-linguistic and neuro-semantic mechanisms, which when intensified are recognized as 'mental illness'. The usual sort of remedial reading work endeavors to correct these symptoms but touches only by chance the causal mechanisms.

We attempt to reach these mechanisms in a preventive way in all classes and work with students by concentrating on the language-function. Our program is the result of years of observation of linguistic difficulties, but until Korzybski's introduction of General Semantics (A General Theory of Values) and the Extensional Method of 'thinking' a direct fundamental attack on the correction of the difficulties seemed impossible. Extensionalization is a key term in the non-elementalistic terminology of the new science of General Semantics. It is useful to an understanding of our 'Mental Health' objective to state briefly that in connection with empirical results of extensional training reported before the First American Congress of General Semantics (March 1 and 2, 1935, Ellensburg, Washington), extensionalization is recognized by some educators and psychiatrists as the basis of scientific healthy thinking, and the essential factor in the beneficial results of the psychotherapeutic technique in adjusting the individual. The technique for group work in extensionalization makes it a general educational procedure of preventive as well as remedial value. General Semantics also gives us natural standards and methods for the evaluation of students' conduct which produce desirable results without preaching.

The program has been under way less than a year, in actual practice only three

(2) See my 'A Proposed Research Investigation Valuable in the Improvement of Teaching on the Junior College Level', Teachers College, Columbia, July 1935, copies of which may be had on request to the Institute of General Semantics, Chicago.

months. Our objectives are to improve the life adjustments of our students, and their scholastic achievements, without in any way increasing the costs of instruction, and without changing the standard college preparatory curriculum. The Barstow School for girls is a private incorporated non-profit-making institution without endowment or funds for research. North Central Association requirements and preparation for College Entrance Board Examinations prohibit in our situation any significant changes in subject matter and units of instruction.

The School has been a member of the Educational Records Bureau since the Autumn of 1934, when I took the principalship. We use their Co-operative Testing Program. These and all other tests are scored and reported by the Bureau. Case studies and records of the pupils in grades eight through twelve have been made, and are kept up-to-date at nine-week intervals. Individual and group remedial instruction in reading, writing and arithmetic is given on the basis of performance on the Nelson-Denny Reading tests, the American Council Psychological Examinations, and of weaknesses which appear in course. Many of our high-school pupils have come from the public school system of Kansas City, which gives only seven years of grade work. Many need a complete education in language skills before they can cope with the work of our high school. The I. Q. ratings in grades eight to twelve range from ninety to one hundred thirty-five, with the median at one hundred ten. The group is not highly selective on the basis of 'intelligence' or economic and social background, about the same as is found in public high schools in the better residential areas. There is a high percentage of the more subtle forms of readjustment and of glandular unbalance.

It is difficult to present in the limited space of a paper so radical and yet so subtle a change as the re-orientation of an entire high school. The nature of the change is such that it should not be done piece-meal. Also the usual procedures in a restricted educational experiment cannot be observed, as results are equally subtle and involve life values which are qualitative. Measurement of quantitative results will therefore be possible in only limited aspects - and not under 'controlled conditions.' (3) It seems expedient only to set down what we have done in the three months since the program was formally undertaken, calling attention to the handicap of "carrying on" as usual the prescribed work of the high school. The new general language curriculum of the Eighth Grade is especially significant we believe. Here is the only point at which a complete revision of subject matter based on the language-function has been possible. This, with current results, is reported in detail (4); also two case-studies of atypical linguistic skills from our remedial program, which are significant from our point of view. The other work falls under the heading of teacher-training in General Semantics and the Extensional Method. With the exception of one mathematics and two foreign-language teachers, a new teaching staff was selected for the current year. All are under thirty, have done work beyond the Master's in their teaching subject at such universities and colleges as Minnesota, Radcliffe, Bryn Mawr, Michigan, Yale, Edinburgh and Virginia. Teaching experience was limited to the college level so that canalization in high-school-teaching attitudes and standards would be at a minimum. The teacher who is creating and teaching the Eighth Grade course has a Ph.D. degree in the field of Philology. The desire that all teachers have some advanced training in Mathematics could not be realized.

Before the opening of school all teachers were asked to study Science and Sanity by Korzybski. The aim was to give teachers the modern scientific orientation toward the structure of the world and themselves, introduce them to the central role of the language-function in conditioning human reactivity and give them some notion of the

(3) See the reports of Harold Potts and Joseph C. Trainor.

(4) Omitted from the present text. See Bibliographical List, under "Michie, S." Reprints of her report are obtainable, on request, from the Institute of General Semantics, Chicago.

psycho-logical mechanisms of adjustment. Part One of Korzybski's great work is an ideal text for teachers. It gives interpretative data on colloido-quantum structures essential for some orientation in a world created by modern physico-mathematical sciences and for the understanding of the functioning of this world of physico-chemical processes and its relationship to the neuro-physiological receptive mechanisms by which we react to the environment. Part One condenses for purposes of orientation what would amount to a whole library of modern science. In this connection, I would mention the crying need for new high-school science texts which are correct according to modern scientific structural data (1938). With present texts most schools are teaching false knowledge, which as known in psychiatry is a causative factor for many 'mental' ills.

Count Korzybski conducted a Seminar course in General Semantics at the Barstow School for five weeks beginning October 16. There were three evening meetings per week and each teacher had a private conference. Gratifying results in better personal adjustments of several teachers are already apparent. Six months or more of intensive work are usually required for extensionalization and mastery of the system by intelligent adults. (This time can apparently be reduced for children, especially before adolescence). In some cases enough was accomplished in the Seminar for the teachers, with the aid of the book and lecture notes, to carry on the work with the students. For the present, the 8th and 9th grade English and Science classes (Physics, Biology, General Science) offer the most obvious opportunities for direct presentation. In other classes teachers will attempt to deepen the feeling for the new extensional orientation, both their own and the students'. In written and oral expression the emphasis is on the structure of language and its relation to more-accurate representation of facts. In guidance work with students, the Director constantly calls attention to linguistic issues and problems of evaluation.

Note: Our viewpoint on the bases of integration and correlation is set forth in the catalogue as follows:

True integration takes place in the individual, not in the arrangement of the curriculum. Integration represents only an unworkable notion unless we consciously use some mechanisms in the nervous system to insure integration within the personality. For this General Semantics furnishes the techniques.

Complete integration of learning and use of knowledge depends upon a union of desirable attitudes and disciplined thought-processes. Proper training in the use of the language-function and symbolization in dealing with the reality of the inner and outer self in relation to others and the world, effects mechanisms which can be used from infancy. Language and problems of correct symbolization and evaluation receive fundamental attention throughout the program. A unified viewpoint and the techniques of the extensional method are relied upon for true integration, although due attention is given to correlation and integration of subject matter and activities in the general curriculum.

PART III: TWO CASE STUDIES OF READING DIFFICULTIES (5)

We are becoming increasingly aware of the many types of verbal maladjustment in all our remedial cases. This statement includes not only those cases of virtual illiteracy, in which the reading and writing function has been grossly neglected during the early years of the student's education, but also those instances of so-called arithmetical or mathematical imbecility, accompanied by a disproportionate skill in the use of verbal material. When this latter type of distribution of ability is regarded as

(5) Reported by Dana W. Brown in collaboration with Miss Kendig. For Part II, see note 4, above.

normal, when the flair for verbalization is encouraged, and the mathematical weakness is regarded with amused indulgence, or at best merely attacked by endless drilling at sums and the multiplication table, the specific weakness is never remedied; and what is more serious, the general level of achievement in all work is very likely to remain unchanged. From more-analytical observation of these students we are beginning to learn that there is a language maladjustment here as real as that of the illiterate, though of a different sort; that this kind of maladjustment is a serious handicap, of proportions unexpected during the era which regarded word-mastery as an index of success (6); and that the remedial program for these students must be organized along different lines.

I shall mention here two students, one a case of extreme under-verbalization, the other of oververbalization, both of whom are being helped by a remedial program centered about the language-function. 'X' is fifteen years old, a sophomore in high school and virtually an illiterate. She suffers from two severe handicaps. Serious eye-trouble prevented her from reading in normal amounts during childhood, and auditory inattentiveness and a lack of visual memory have made her a confirmed symbol-twister; she has therefore never learned to spell nor to recognize in print many of the simplest words. She ranks very low on such general intelligence tests as the American Council Psychological because of the preponderance of verbal material; she has an approximate I. Q. of 95. Her achievement in school work, however, reveals unexpected ability. She is taking second-year algebra and general science and doing good work in both. She has difficulty in her foreign language because learning new symbols, i.e. vocabularies and grammatical forms, is a Herculean task; however, what she learns she applies with a high degree of proficiency to constructing sentences. 'X' is strictly honest on all occasions and tends to face her difficulties squarely, and sincerely wishes to be helped. Her case represents the standard idea of a reading deficiency and obviously calls for as much simple drill in the mechanics of reading and writing and building of language symbols as her visual weakness will permit.

'Y's' case is of a very different sort. She is fourteen and a freshman in high school. She comes from a social background similar to 'X's'. Like her she has lived for many years alone with her father, has been treated as an adult and her only real world is a social one. Unlike the other girl, however, she is not reliable and does not care to become adjusted to school life and resists remedial work. She reads omnivorously, and with lightning rapidity, but with mediocre comprehension of cumulative content. On vocabulary tests she ranks with the two best in her class and has an approximate I. Q. of 105. Her school reports, however, constitute a long record of failure, and she was considered incapable of performing high-school work. In English, her best subject, she wrote charming, if somewhat fanciful themes, with however, alarming gaps in the thought sequence, and was incapable of understanding grammar and syntax. Meaning in a foreign language she could only get through intuition; the representation of tense, number and gender by a given set of symbols completely eluded her. In arithmetic she was considered hopeless. Although she had learned how to perform the four operations, to manipulate fractions and decimals, and rather enjoyed playing with mathematical symbols, she could never be depended upon for accurate results. Because the symbols had no relation to any real situation, she changed decimal points, added zeros, turned fractions upside down all at her whim and pleasure. Given a 'thought-problem' she would rapidly cover the board with a set of figures, more or less approximating those in the problem, combine them in fantastic ways unconnected with the sit-

(5) The following quotation from the Introduction to the Johnson-O'Connor English Vocabulary Test, Worksample, 95, is a typical example of this point of view: "Research studies during the past eight years have disclosed that a large vocabulary is the most reliable single measure for identifying success, general success, not only in school and college but also in business and professions."

uation to be solved, and brightly produce what was purported to be the 'answer'.

It was obvious that this student was not handicapped by inability to learn, but apparently by over-symbolization and identification of symbol (both verbal and mathematical) with reality. In other words there existed a very real disorder in the language-function. It was however of a different sort from 'X's' and could never have been helped by a routine program in remedial reading. Here a thorough retraining through the methods of General Semantics seemed to be the only hope for the student's reconstruction.

The work has been done with both verbal and mathematical language, but the latter has proved most effective. We started our work with numbers. 'Y' was repeatedly told that when she saw a figure she was always to remember that it represented that number of some object, such as blocks, apples, pennies. She was then asked to visualize objects when she saw the figure, such as five pennies on the table. When we came to arithmetical operations, she was given a symbol and asked to relate it to as many situations as she could think of. We then had her go through the physical notion of adding, dividing, etc., with concrete objects. The same thing was done with fractions. She quartered apples, matches, doughnuts, or any other dissectable object that was available, and for the first time understood reducing fractions to lowest terms. As soon as 'thought-problems' were introduced we were faced, of course, with her weakness in reading-comprehension, but were surprised to find that comprehension had improved during the period of work with arithmetic. In the reading work, virtually the same technique was applied to the verbal symbol as had been applied previously to the mathematical figure. The student was given short passages of reading matter, in which the material was as concrete as possible. As she read she was made to stop at the end of each phrase or any group of words representing a situation, made to visualize, even to draw a picture or scheme on the board of what she had seen. She was finally confronted with a passage involving arithmetical ideas, in fact a 'thought-problem'. The outcome was gratifying. As a result of this two-fold training she was able for the first time to detect of her own accord errors in her answers.

The work of this student is at present incomplete, but she is developing more organic poise and the general level of her work is improving.

REPORT OF EXPERIMENT MADE BY THE WILLIAMS INSTITUTE*

By Cora L. Williams**
Berkeley, California

(Condensed)

The shift which is taking place in the bases of civilization is subjecting our educational edifice to untoward strain and stress. We are wasting valuable time while we talk about the beauty of its architecture and the nobility of its purpose. It is structure, and structure alone, that counts. Count Korzybski presents a plan for reinforcing our Education and putting it upon a sound scientific foundation. His plan is, I believe, entirely practicable. This report brings to his fundamental principles the verification of an educational experiment extending over a period of nearly thirty years

* Read at the Ellensburg Congress, 1935.

** Miss Williams died in the Spring of 1937.

In 1906, I resigned my position as instructor of mathematics in the University of California to start a school for the development of the individual. I had come to the conclusion that something is fundamentally wrong with our mass education. I did not know then, as I do now, that this failure is owing largely to the fallacy of identity underlying its entire procedure. But I did know that children should not be sorted and graded as so many oranges, that no two are alike. While my school succeeded in helping hundreds of boys and girls over difficult places, it did not succeed in arousing in them the mental interest and the creative purpose toward life that was my objective. They were quite content to make good grades. Like Pavlov's dogs they mistook the symbol for the thing symbolized. And this, I venture to say, will continue to be the case as long as Education holds to the marking system.

Twelve years in this work convinced me that the Education Problem has more dimensions than we think; that our trouble comes from trying to solve it with too few. So, I started my experiment anew. This time I bent my effort to the discovering of an education based upon our individual relatedness, instead of our individual separateness. I took for my fundamental postulate: Education should prepare the individual to become a creative component of the life-process. And because this is integrative, I made my measure of student achievement the power to co-operate with others, rather than to compete with others. Other deductions from my basic concept were: education should keep abreast of the movement of life and thought; the youth should be given, early in his course, a generalized concept of the Universe; knowledge should be presented as a unified whole, instead of as a series of separate subjects.

Upon this body of concepts I founded, in 1918, the Institute for Creative Education. In order that my results might have significance for education, generally, I planned my demonstrative school to parallel, in set-up and curriculum, the public school. Special attention was given to the arts for the purpose of developing the child's emotional nature along with his mental. Classes were small, limited to twelve members. Recitations were conducted after the manner of the seminar. The effort of the teacher was to make each student feel himself a vital part of the group. Always, the purpose of the group was to combine the contributions of its members to the creating of something new, something more than any of them could achieve alone. In place of the competitive marking system, we had what we called "co-operative charts" for showing the purpose and achievement of the class through the term. (See my "Adding a New Dimension to Education", 1926, pp.228-32). The individual student was awakened to his responsibility to the group, and the group, in turn, saw that it had a responsibility to its members. The weak student was inspired to greater effort; the able student learned the joy of helpfulness; and all were lifted to a new level of power. They had tapped that strange new energy which Count Korzybski calls "time-binding".

My first concern was to put the learning of the so-called fundamental subjects upon as happy a basis as possible. The child who is worried and distraught over his studies is not going to be a creative component of the life about him. And, because arithmetic is the chief offender in this regard, I took special care to see that it was taught by teachers possessed of a psychological insight into how the growing mind reacts to the truths of number. The reason why so many adults fear mathematics is that some number complex was set up in their childhood. Our psychological care resulted in a happy learning of arithmetic, which had an effect upon the whole work of the school. Henri Poincaré knew whereof he spoke when he said that mathematical reasoning is possessed of a creative virtue.

The teaching of geometry gave us further opportunity to make sure that our young people had the proper foundation for a rational life. Instead of presenting Euclidean geometry in the usual way, as a body of eternally valid truths concerning the nature of space, we presented that geometry in its logical relation to the new geometries.

Once the student grasps the fact that the differences among those geometries lies in the postulates assumed, he is able to rearrange the theorems of his Euclid to make its study serve as an introduction to all three geometries.

The theorems of plane geometry then stand arranged, not in five books, but in three: first, those which are true alike for parabolic, hyperbolic, and elliptic geometries; second, those which are true of parabolic and hyperbolic geometries; and, third, those which are true for parabolic geometry only. (See my Syllabus of Plane Geometry). The student sees in what respect the foundations of these three geometries are the same and in what respect they differ. He sees that they have in common those theorems, and only those theorems, which are deducible from the assumptions they hold in common. He knows also what theorems are distinctive to each geometry. For instance, he knows that the sum of the angles of a triangle is exactly two right angles only in parabolic geometry; that in hyperbolic and elliptic geometries the angle-sum varies with the size of the triangle; in hyperbolic geometry being always less than two right angles and in elliptical, always more.

Perhaps the most distinctive feature of our present experimental work in the Junior College is an orientation course, based upon mathematics. Our purpose in this course is to lead students to see the "human worth of rigorous thinking". Also, we have found in the theory of hyperspace a structural basis for the presentation of ethical truths which has a direct appeal to our mechanical-minded youth. I believe that this, or some similar course, if given generally in our colleges, would result in the growth of a new social consciousness, so much needed today.

What have we demonstrated by this experiment in non-Aristotelian, non-elementalistic, four-dimensional space-time education? First: That schools can be life-giving centers for both teachers and pupils. Those who have been with us, old and young, testify, alike, to the enhancement of interest and power which they experienced during their stay with us. Luther Burbank, keen observer of the human plant, as well as of other plants, wrote me, "Your young people who called on me were very interesting specimens of humanity. If they were a sample, you have my handshake as a discoverer of a splendid new form of education." Second: That co-operation can be made a greater incentive to work and to study than can competition. The Stanford Achievement Test (see "Adding a New Dimension to Education") shows that, although our children were young for their grades, they excelled public-school children in arithmetic and in many other very striking ways. What is more significant still, this test also shows that the group of children who had been in our school the longer period greatly excelled the group who had been in it the shorter period. Third: That we have found the key to the unlocking of genius, which we believe, with Mary Austin, to be a "normal human possession". Of the fifty-five students who were under our training for a period of four or more years, all but five entered college, thirty-three have graduated and others will do so. The five who did not enter have achieved distinction in artistic fields. Our students are becoming creative components of the life-process, which is the first mark of genius. Fourth: That we have found the way to world unity and peace. This is confirmed by Dr. David Starr Jordan, great peace advocate. He said, "The Williams Institute is doing work that promises to be of importance to the world."

THE PLACE OF GENERAL SEMANTICS IN JOURNALISM*

By A. Ranger Tyler
Albany Evening News, Albany, N. Y.

Thorough training in General Semantics for publishers and staffs of newspapers would result in much-improved newspapers. This would lead, because of the prominent position occupied by newspapers in the lives of their readers, to great forward steps in the semantic education of the public. Quite important would be its automatic effect, a result of submission to newspapers of this proposed type over a long period. Coupled with more formal training in general semantics imposed by the government, great progress toward a more sane nation would be inevitable.

The obstacles in the path of this changed attitude on the part of newspapers are numerous and serious. In the first place, perhaps, is the original difficulty of convincing publishers and their staffs of the basic reasons for the move. Publishers who are interested primarily in the profits are not semantically adjusted to evaluate a great movement involved in the sane-izing of their readers. Many of them, especially those who reap large monetary rewards from the practice of "yellow journalism", would be loath to make the change, and would probably oppose even the semantic education of the public outside the journalistic field.

The situation is indeed so grave that Korzybski's suggestion, that only newspapermen licensed on the basis of their own successful training in General Semantics would be permitted to function in their vocation, might be necessary to attain the ends sought.

It is not difficult to imagine the hue and cry that would follow the introduction of such a program. Willfully, in the old elementalistic sense, or automatically, in the non-Aristotelian sense, publishers and their staffs would again raise the question of "freedom of the press".

The fact that the license would have no meaning in relation to the meaning of "freedom of the press", as intended in the Constitution, would escape these very probable objectors. And yet these same men accept the limitations placed upon them by automobile traffic laws, submit to an examination of their fitness to drive such a machine, and wolder if ever feel that their constitutionally-guaranteed rights of the "pursuit of happiness" have been impaired. This example is a modification of a comparison made by Korzybski in "Science and Sanity".

In order to get semantically untrained newspaper men to recognize the necessity of submitting to an examination, after proper and adequate semantic training, as an indication that they were indeed sane enough to pursue their profession or vocation, it may be necessary to impress upon them that their unsanity is truly a fact, as far as we know in 1935, for instance. Of course, no newspaper man of any consequence will be ready to accept the proposition that he is insane, but if the difference, demonstrable and obvious to those better trained, between insane and unsane, can be pointed out, part of the trouble of convincing him will have been removed.

Truer-to-fact recording of events, better selection of feature material, more-nearly scientific analysis of news events and so less-distorted opinion in newspaper editorial columns are among the changes possible in newspapers, changes semantically beneficial to the reading public, if staffs and publishers take seriously proper semantic training. Conversely, these results will be forced upon newspapers by their readers

* Read at the Ellensburg Congress, 1935.

if the public should become semantically trained in advance of the newspapers. But this latter is hardly possible because newspapers themselves, if not through their editorial columns, which are probably read by no more than 10 per cent of subscribers, exert through their news columns great influence on what have been called in the past the "thinking habits" of the public.

We feel certain, on the basis of data presented up to today, that it is not only the "thinking habits" of the reading public that have been changed or effected by newspapers, but the reader's whole series of semantic reactions. This involves the organism as a whole. If this is true to fact, newspapers which are more nearly sane in their presentation of news, features, etc., are improving the semantic reactions of their readers; newspapers unsane, if not indeed actually hysterical, as are for the most part the products of the Hearst chain, further disturb the semantic reactions of their readers. The first group, i.e., perhaps unconsciously, offering a reflection of the world,--people, events, etc.,--as it exists in its structural relationship with those who read; the second group persists in making its readers abstract pathologically, with consequent disturbances, semantically. Thus, a public reading the newspapers of today can not but be delayed in attaining sanity, no matter how much effort is applied in other directions.

While many types of persons read the "yellow journal" newspapers, the great bulk of the circulation is among those who are even less well adjusted semantically than those who read the so-called good newspapers. One result is that continued doses of yellow journalism to such people make them even less prepared to react in an adult manner to events that require this form of reaction. And this requirement applies almost "universally".

The probability that newspapers may become "adult", and their readers likewise, at present seems remote. The best thing to do now is to emphasize the problems that surround newspapers, stressing where possible the need for a greater attention to orderly abstracting on the part of newspaper staffs, gaining confidence of editors and reporters individually. Appreciation of the aims of General Semantics is also essential. The difficulty here is that few editors or staff members are qualified at present to discuss or understand the underlying structure of the subject. Advertising is a fertile field for comment, too large to enter into in this paper. One mention will be enough for the present. Certain types of advertising, if indeed not all that we see either in newspapers or magazines, work actual semantic harm through the "bunk" that is poured into human beings subjected to them. I defy any but a sane person to evaluate, sanely, similar products, even if the unsane person has the objects in his hands, after having read advertisements over a period of a year, from rival producers.

A possible result of a properly adjusted humanity in the future, as regards newspapers, is that readers will be willing to bear more of the actual publishing expenses and relieve the paper of having to depend so much on advertising revenues. This will help to eliminate one of the most disturbing influences of newspaper work, the pressure brought by advertising offices on editorial forces to color stories, either to favor advertisers positively, or to tone down a story that obviously cannot be omitted so that possible abuse is materially reduced. This is not all. When used, the puffs that are offered editors for various products are in themselves pernicious semantically upon the readers. Further, when newspapers are published to report news without thought to profits as opposed to sane influences of the newspapers--that is, without going into the "red" as long as our present economic system is continued--a great step will be taken toward developing a sane press.

A BUSINESS MAN'S EXPERIENCE WITH KORZYBSKI'S "SCIENCE AND SANITY"

On receipt of the book in May of 1934 I followed my usual practice of reading carefully and with understanding rather than pass lightly over parts which might at first seem difficult. In the course of the reading my conception of the nature of "material" things was altered; my ideas of "infinity" and the infinite were ironed out; the futility of feelings and of "the religious attitude" was made apparent; more guarded reactions were attained in everyday affairs.

To clinch the new meanings I procured a Structural Differential as recommended by the author and find it very helpful. No matter how perplexed I am by adverse conditions, the use of the Differential orders the train of thought anew and prepares me for definite action. (Incidentally, though I never before studied calculus, I now found the subject very interesting as depicting the intricate complexity of the environment, discussed by the author in his chapters on structure). What errors I have avoided and shall escape through increased mental alertness thus obtained I can hardly underevaluate.

I do not wish to convey the idea that all is perfect harmony, for such is not the case. But by habitual instant application of the principle of non-identification in abstracting on the various levels it is easier to discern the causes of differences and to act accordingly. Furthermore this check has become automatic with me, renewed effort being required only when the element of surprise enters, and I am usually fortified against surprises.

On an accounting question involving the status of a remodeled building it was evident to me that after the walls were replaced with brick, the floor cemented, the roof renovated, and new plumbing, heating and lighting equipment installed, the building was no longer the same, even though the original steel framework and window sashes were retained in its reconstruction. After a somewhat heated but friendly argument my adversaries remained unconvinced and held that the correct date of completion of the building was the date when the original structure was finished and that the correct construction cost must include the entire expenditure for the original building plus the cost of remodeling. Of seven people engaged in the discussion I noticed that my five opponents all differed from each other in detail as to the proper method of procedure. Referring then to Thornton's "Financial Examinations" as authority I found that my own idea in the matter of costs is actually the one carried out in approved accounting practice. In his chapter on "Fixed Assets" Thornton states and shows by example that the net result may properly be the capitalization of the difference between the original cost of the old work and the cost of the new replacement, so as to bring the property account up to the cost value of the remodeled building.

On another occasion a foreman in planning his work made the mistake of identifying the end of a two-day period with the program itself, counting only two days to the beginning of a repetition of the two-day program to be started two days after the close of the first, elapsed time being the important consideration. If he had had the advantage of training in non-aristotelian principles he would no doubt have made the correct count of four days between the corresponding periods. The error was promptly acknowledged and corrected when pointed out to him.

It is not claimed that all the common mistakes can be eliminated, such as those due to oversight or misrepresentation; but mine are noticeably less frequent. I believe that if I had had this training at an early age I might have averted several tragedies. I would say that its greatest value lies in the fact that it puts one on

* Read at the Ellensburg Congress, 1935.

guard against copying the mistakes of others. This is the more important since so often those who are most prone to common error are the most insistent on having their own way in the conduct of affairs in which they are interested. An example of this is the housewife who persists in buying her milk from a skyster dairyman at a price in violation of the N. R. A. Code.

Numerous instances of faulty abstracting with which I am brought into contact could be cited, of daily occurrence at home and at work. I should like very much to receive and answer letters from others who are interested in semantics. There ought to be some means of frequent intercommunication. Why not organize a semanticists' correspondence club?

Sincerely,

Charles H. Owen.

Address: P. O. Box No. 336
Osborn, Ohio

Date: February 18, 1935

SOCIAL CASEWORK AND THE ART OF THINKING*

By Sydney Maslen
The Charity Organization Society, New York City

(Condensed)

Perhaps other caseworkers share my own limitations of ability to sense more precisely their own and their clients' feelings. Our task as social caseworkers is to become skillful to apprehend and put to use the emotional tones, experiences and values of which we can be aware and which can perhaps be developed for use in the casework relationship. This ability comes only from experience. But I want to question whether experience may not be made more serviceable to us if we can become more aware of the thinking-content in it. Before examining what I am about to propose as a means of developing more refined and more conscious processes of reasoning, it would be well to examine the methods of reasoning which casework now employs.

Social casework is keeping in the middle of the stream of thinking current for today. No longer are we willing to diagnose and prognose a case, to put our fingers on the problem or announce the solution. I believe that the social worker today is as fully aware as the scientist of the inaccuracies of thinking which separates phenomena into watertight compartments, thinking in terms of "either--or", or denies the pervasion of inter-relationships in all areas of life. It is not so long since it was possible, however, for people to assert with conviction that a certain course of action, phenomenon, or idea was definitely one thing and not another. But today debates are losing popularity because we recognize that progress does not come from haggling over words.

The methods of reasoning which casework now employs can be seen to correspond to the four principles of reasoning used in dynamic logic. For the sake of clarity and

* Read at the Ellensburg Congress, 1935.

understanding these are mentioned separately, but in reality they must be seen as operating simultaneously.

(A) The principle of polarity. "Every unit of thought in efficient thinking must have its definite and explicitly expressed opposite." E.g.: We cannot understand the concept of heat without its opposite, cold. In the case of a client who says he wants to find a job but who makes excuses for not applying for the openings suggested to him by the caseworker, the expressed desire to work is seen as the opposite of the unexpressed desire not to work.

(B) The principle of partial functioning of concepts. "New experiences settle in the mind between their two opposite poles at a distance inversely proportionate to their likeness to each pole."⁽¹⁾ E.g.: When we judge a place to be warm, we think of it in relation to so much cold, so much heat. In the case of a client who has formerly managed to subsist on a relief allowance but who now declares that, on a CWA job giving him only a very slightly higher income, he cannot be self-sustaining, the caseworker helps him to work through to a logical solution—to see the necessity, when no more income is forthcoming, for so spending his wages that he gets the most value from them; and to base his conclusions on reasoning from facts rather than reasoning from statements of facts, the ability to manage being seen as relative to the source of income—in the one instance income from work, and in the other, income without work.

(C) "The essence of dynamic reasoning is the establishment of continuity between the opposite poles of a unit of thought, which tends to terminate in the realization of its qualitative identity." E.g.: We strengthen conclusions we arrive at by securing as much pertinent data as possible. We can only tell the degree of warmth when we know all possible degrees of temperature between cold and hot. We only know personality to the extent to which we understand its possible functioning in all areas of development; an ever changing complex, a growing, conscious, experiencing organism.

(D) "No statement has any meaning without a certain quantitative index which should be explicitly indicated preferably in terms of objective continuous scales between the poles of opposites." For this reason we use words like 'few', 'many', 'most'. E.g.: We define warmth by locating it in a continuum whose poles are hot and cold by an objective degree of measurement (thermometer). We understand statements about facts by seeing the facts themselves in relation to their context of feelings, gesture, posture, voice—as many overt manifestations of emotional and physiological changes as we can observe. When a client tells how last week he thought of deserting his wife, then hurriedly states that of course he has no thought of deserting her now, the caseworker not only notes his nervous manifestations as he is saying this, but sets this incident in her mind within its context of both the client's situation and relationships and whatever else she knows of his previous social setting and personality.

I submit that social casework, although it actually uses the above methods of dynamic reasoning, is not very much aware of their use. Perhaps casework could be made more efficient and skillful if its conscious use of this logic made the casework process more sensitive to apprehend and locate the real difficulties with which clients are faced. Whether the use of such analysis so as to more readily get at meanings might be helpful as one more tool or method for casework remains to be proved. My wish at this juncture is to suggest a possible way in which this could to a certain degree be ascertained.

One might analyze case records to evaluate the methods of thinking utilized. This seems rather a cold, static process when one considers what might be accomplished by

(1) B. B. Bogoslovsky, "The Technique of Controversy" (1926).

using dynamic logic as a tool in conducting interviews rather than as a means of digging into history. Nevertheless such a procedure would have value even when we consider the limitations which even the most refined recording must have, since there is after all such disparity between the descriptive possibilities of language and reality itself.

A more dynamic method would be to apply this awareness in methods of reflective thinking to one's actual case load as an experiment. This should of course be done under as controlled conditions as possible, with the caseworker continuing in the same agency and under the same supervisor. It would seem advisable between interviews to analyze and evaluate the interviews in conference with a supervisor or other casework specialist. The prospects seem promising that this can be a means whereby the client can make still more use of the precious hour. With this new tool one might hope for more facility in viewing the same experience from different angles. The questions and confidences which the client brings to the caseworker will be seen as being, themselves, consequences in causal-effect relationships. This four-dimensional scope of thinking might indeed help the client to view experience more nearly in its total perspective.

It is perhaps hardly necessary to mention that while dynamic logic may be helpful if used to assist the client in expressing whatever he wishes to express, it may be far from helpful if used as a mode of inquisitorial questioning as to extract information which only the caseworker feels to be of value.

A SEMANTIC VIEW OF THE GENERAL FORMULA OF HEREDITY*

By Harry L. Laughlin
Carnegie Institution of Washington
Cold Spring Harbor, New York.

The principal task of science is the discovery of truth. This expression might be paraphrased and specialized a little by saying that the direct business of scientific research is to find still more accurate mathematical descriptions and interpretations of Nature's behavior. As we learn more and more about "how-it-is" from observation and accurate measurement, we have in our possession materials (we must invent the tools) for tackling the problem "why-it-is". All science which is quantitative must use the tools of mathematics for the invention of yard-sticks which measure the subject under investigation. Adjectives and diagnoses describe, but only yard-sticks measure. It took humanity a great many thousands of years after the dawn of reason to invent a practical yard-stick for length. A score of centuries more of human experience and study were required to make this yard-stick for length quantitatively accurate, and still more centuries to invent the science of yard-stick making. First there must be definite segregation, description and diagnosis of the thing to be investigated, then it is possible to invent a quantitatively accurate yard-stick for measuring this thing - this behavior or structural entity. Science is then in possession of a powerful tool for investigating the problem: "How does Nature behave in governing the characteristic activities of the particular subject under consideration". The application of accurate yard-sticks to many observed data - other quantities and activities except that measured by the yard-stick being constant - these are the prime requisites for scientific study.

As a specific case in point let us take the matter of the investigation of racing

* Read at the Ellensburg Congress, 1935.

capacity in the Thoroughbred or running horse. High capacity in this complex anatomical, physiological and temperamental function is known to be highly hereditary among Thoroughbred horses. What are the rules of its inheritance? After long investigation it was found necessary to back up from the direct study of inheritance and to invent an accurate yard-stick for the measurement of racing capacity. But even before that it was necessary to describe and to limit the natural quality - racing capacity. The function of the running horse had then to be measured by a yard-stick which would answer satisfactorily such questions as "which piece of horse-flesh possesses the higher inborn racing capacity, Colt A which $3\frac{1}{2}$ years old, carrying 125 pounds on his back in a truly run race on a fast dirt track for a distance of 8 furlongs, made the time in 2 minutes and 37.1 seconds, which is equivalent to 12.137 seconds per furlong; or 2 $1\frac{1}{4}$ year old Filly B, with 120 pounds on her back in a 6-furlong race truly run on a fast dirt track, which made the time of 1 minute and 11.7 seconds, i.e., in 11.994 seconds per furlong?" Only an accurate yard-stick for racing capacity can answer this question.

After investigation of the racing records of some 10,000 of the best Thoroughbreds which have been produced in the British Isles, the United States, France and other countries, the yard-stick intercompensating these several functions was finally developed. It should be noted in this stage that the development of such a yard-stick - a quantitative thing - depends, in turn, upon the yard-sticks invented for weight, distance and time. These accurate basic yard-sticks consumed many thousands of years of human experience in building and now the physicists say that their C. G. S. system is quite accurate, and supplies the elementary or constituent yard-sticks for physical research - research which seeks to find out how nature behaves in the physical world. Applied to running horses, the method of physical science is thus extended to the field of life or biology. Thus also one yard-stick when accurately made and tried out makes possible the invention of still further accurate yard-sticks for still other complicated functions of natural objects and of Nature's manipulation of them.

Thus, in the field of genetics, research sequence runs as follows:- First, accurate and limiting description and diagnosis; then the invention of yard-sticks measuring accurately the thing under consideration; finally the application of such yard-sticks to measures of the subject quality in the different members of the family-stock, whether the trait in consideration be anatomical, physiological or mental, just so it is accurately measured. We then have the prerequisite researches covered in a way which will make possible the investigation of the rules by which nature transmits the given quality, physical, physiological or mental, from one living generation to the next.

As a specific example, let us see how racing capacity in the Thoroughbred sire influences racing capacity in the offspring, regardless of all other near-kin, that is, the dam and other kin. This is only one aspect of the matter. The sire is only one factor but in measuring the influence of the sire alone we have a definite and independent piece of evidence which must be measured as such. This assumes that in the selection of data for such a study - namely, the influence of racing capacity in the Thoroughbred sire as a function of racing capacity in the offspring - racing capacity is definitely measurable in the individual, that a definite yard-stick has been invented for the accurate measure of this quality, and that this yard-stick has been carefully applied to many family groups of closely related direct and collateral kin, all other factors being constant. We then have the prerequisite set-up and studies for seeking an answer to the problem: "How is racing capacity inherited - by what rule does nature govern this quality in heredity?" It assumes also, if we are studying the sire as a single isolated influence, that all these factors must be considered, and one more, namely, the selection of sires must have been random with no assortative matings, i.e., all other kin which are major factors in determining racing capacity in the offspring must be disregarded and random sampled in the selection of sires and offspring. With these factors and background carefully observed over many years of study, the following formula presents the

mathematical picture of how, in the Thoroughbred horse of recent years, Nature has governed the influence of the sire (regardless of all other kin) on the offspring. This formula is

$$K = f(M, R) \quad \left\{ \begin{array}{l} FC = -495.5 + 14.046M - 10973M^2 + .0002882M^3 \\ K_{fc} = .3038 - .00317M + .00001622M^2 \\ G = \frac{1.995}{K_{fc}} + \frac{R-FC}{R-FC} (.9378 - 1.4276M + .003758M^2) \end{array} \right.$$

$$K = K_{fc} \left(\frac{-(FC - R)^2}{20^2} \right)$$

The mathematical models for formulae of this pattern are shown in Figures 1 and 2.

To read this graph the three dimensions are: (1) Forward-backward coordinate, the prediction-basis or Manton, (M); (2) The left-to-right coordinate, the thing predicted, or Ergon - the real thing (R); (3) The upward-downward coordinate, probability of likelihood, Eikon (K). Thus how convenient it is that the three dimensions in space with which we are all familiar can be made to coincide exactly with the coordinates for the three things desired in a semantic study of this sort; namely,

$$K = f(M, R)$$

that is, probability (K) is a quantitative function of the prediction-basis (M) and the thing-predicted (R). In the actual formula above K = probability; M = Racing Capacity of the sire; and R = Racing Capacity of the offspring.

The detailed explanation of this particular relationship, sire-offspring, and also the formula and three-dimension graph for each of several other near-kin, each based on 1,000 specific cases, have been worked out. Then the integrated resultant of the interaction of these several nearest blood-kin lays the basis for the computation of the General or Pattern Formula of Heredity, and its use in the prediction of inborn racing capacity in the Thoroughbred horse.

Thus the yard-stick background is outlined for the presentation of the mathematical picture of "How Nature transmits racing capacity from one generation of Thoroughbred horses to the next."

Thus the mathematical foundation is laid, in terms of more and accurate pictures and measures of how-it-is, for still further study which will seek a little better view of the "why" or the cause.

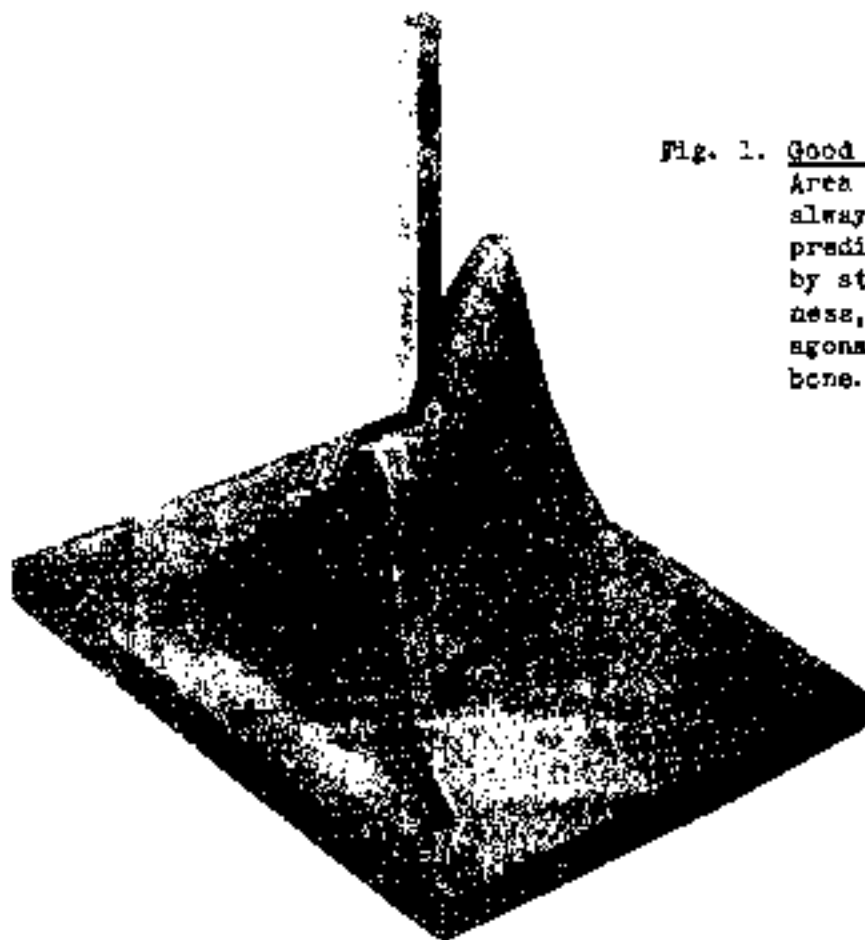


Fig. 1. Good Prediction

Area of cross-section
always = 1,000. Good
prediction is connoted
by steepness and narrow-
ness, and "degree of di-
agonalness of the back-
bone."

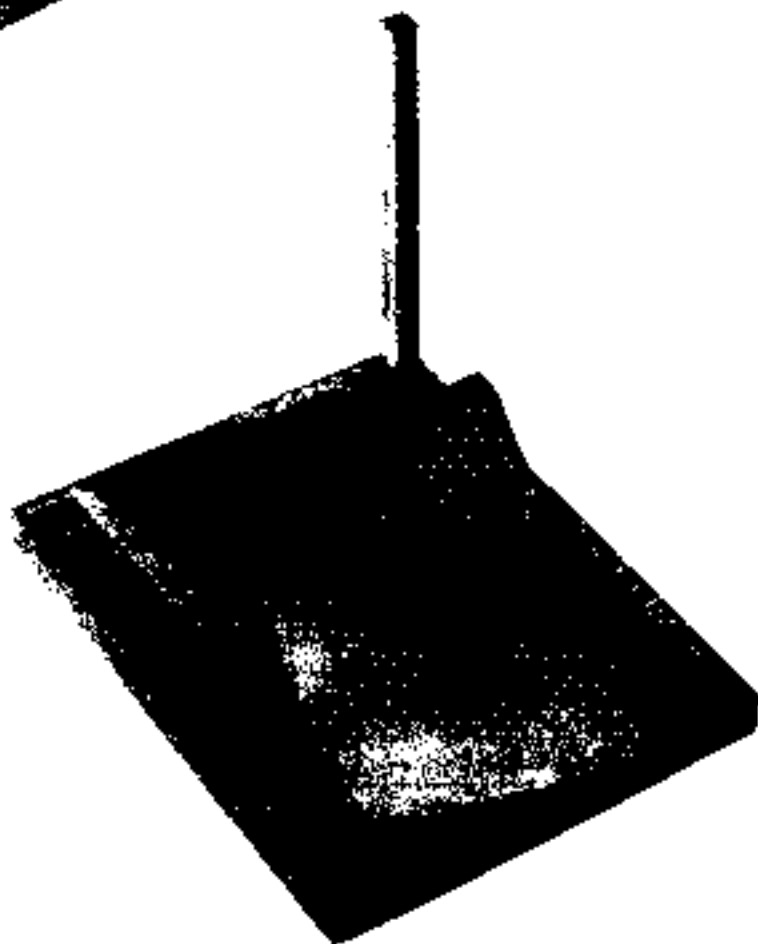


Fig. 2. Poor Prediction

Area of cross-section
always = 1,000, but
flatness and little
"diagonalness of the
back-bone" connotes
poor prediction.

creation of species including man, and was led to the recognition of Nature, or the Cosmos, or the Universe as one all-sufficient creative and self-sustaining whole. In this unified whole, mankind was included not only in his physical aspects, but in his moral and intellectual nature as well. He regarded individual man as the unit of moral responsibility. He sought to discover the reality of all that experiential observation can find in any one unit.

Accordingly, being a naturalist, whose initial task is to describe and classify natural phenomena: and being faced with the problem of man, there was no alternative open to him but to treat the problem first of all on a purely descriptive and classificatory basis. Now classification involves the idea of differentiation, and Darwin saw as the characteristic that most differentiates homo sapiens from all the other species of animal life--the possession of a moral sense--the innate idea of "ought". But what, he inquired, is the moral sense or conscience? He found it in the acceptance of the idea that the individual should willingly give up life, his most precious possession, for other individuals or for great causes after due deliberation. Although instances of somewhat similar action have been observed in lower species, nowhere are they so widespread and so highly developed as in man. Hence the selection of this as the most defining characteristic. Darwin accepted the mutability of species as a fact, with a perfect faith in the all-embracing creative and self-sustaining power of NATURE. Hence man in all his aspects, the noblest of which give him worth and dignity, is just as much an illustration of the power of nature to create and to sustain itself, as is the development of his prehensile hand or any other significant part of his physical make-up.

The dualistic idea, first popularized in its modern form by Descartes, of an essential antithesis, or dualism, between soul and spirit in one direction, and body and matter in the other, has gradually become untenable. It is increasingly being recognized and affirmed among scientists that homo sapiens must be recognized as a unit organism functioning as it does, and that all the bases for its coming into being must be found in the orderly workings of nature and natural law, and not in some mysterious supra-natural force or energy acting under the guise of 'élan vital' or any other similar conception. In the language of one psychologist, "Dualism is 'dead' and should be buried." Hence the conclusion that morality has its basis in the individual sense of responsibility. And here, where the individual stands out so conspicuously in Darwin's theory of morals, is the place to notice how the group or society fares in his theory. Practically the whole of Chapter VII in The Descent of Man is devoted to this subject.

It appears certain that Darwin laid the foundation and sketched the superstructure of a theory of man that would be entirely consistent with his theory of the origin of known species by transformation of other species, usually not known with certainty. As for man's conception of himself, the following laconic statement seems deducible from Darwin's theory: Self-knowledge, self-regard, and self-control are obligations upon man that are co-ordinate with social-knowledge, social-regard and social-control.

A PRELIMINARY DISCUSSION OF THE APPLICATION OF GENERAL SEMANTICS TO BIOLOGY*

By Rodrick Macdonald
Institute of Biology, Harvard University

Author's Summary

Experimental evidence acquired by the author indicates that Lytechinus variegatus, Echinometra lacunata, Strongylocentrotus adhaerens are functionally bilaterally symmetrical. This evidence, together with observations made by various other investigators, shows that a bilaterally symmetrical organization (structure-function) is the inheritance of all the members of the Echinoidea.

The discussion draws attention to the fact that the structure of the language commonly used to describe biological phenomena does not correspond to the organism-as-a-whole, and non-elementalistic treatment of such phenomena, and therefore has not adequately described the observations of investigators nor their conclusions therefrom. A preliminary attempt has been made to overcome these linguistic difficulties by the use of the term order and its derivatives. There are different levels of orderliness in the dynamic structure-function of an organism which, though differing in complexity of conditions, are fundamentally similar. Confusion of these levels, or failure to recognize them, results in linguistically fictitious descriptions of happenings in nature.

It is more completely demonstrated that multi-bilateral symmetry of structure-function in post-ovum development is not primitive in the Echinoidea but is a secondary development, and ultimately tends to be replaced in their phylogeny by a primitive order of symmetry--a unibilateral symmetry.

CHARLES DARWIN AND THE PROBLEMS OF MORALS**

By W. E. Ritter
University of California

(Condensed)

The chief characteristic of Darwin's work was in his standpoint as a NATURALIST, i.e., one who does not question the evidence of his senses any more than that of his reason; nor the existence of the material world around him, any more than he questions his own existence. In accordance with this, Darwin sought in a perfectly naive manner to investigate and explore the facts of NATURE and establish them by observation first; afterwards to find their origin and cause as far as possible.

By the time he was thirty, as a result of the experiences of his voyage in the 'Beagle', he found himself quite unable to accept the fundamental doctrine of special

* Read at the Ellensburg Congress, 1935. This summary is reproduced from the more extended text published in Proceedings of the American Philosophical Society, 1936: 76, 87, under the title: "A study of symmetry in the Centrechinoidea, based on behavior, with special reference to Lytechinus variegatus; including a short discussion of linguistic difficulties in describing biological phenomena".

**Read at the Ellensburg Congress, 1935.

A NEW COLLOID-PSYCHOLOGICAL PSYCHO-LOGICS*

By Professor W. Burridge, M.D., M.A., Oxon.
The Department of Physiology
King George's Medical College, Lucknow, India

My own researches** have dealt chiefly with the action of drugs on hearts. The researches demonstrate that the excitable tissues of the body possess two sources of energy where previously it had been presumed they had but one. This finding, though important, is not popular, because it automatically disposes of so many other people's pet theories. You will appreciate what I mean if you study the physiology of inhibition and the rebound. Every investigator of this has had to look for two things in a tissue which he presumed to possess one source of energy only. The resulting theory thus attempted to fit the facts to the preconceived notion rather than being framed from the facts themselves. It is not surprising therefore that many and varied theories were produced in consequence.

The existence of the two sources of energy is predictable from what is known concerning colloidal systems. Orthodox speculation, however, predates knowledge of colloidal systems, and, so long as investigators were guided primarily by the traditions of their predecessors, the significance of the newer knowledge concerning colloidal systems was at a discount.

The two sources of energy bear to one another the relationship, the more of the one, the less of the other. This relationship is compatible with two antagonists fighting one another to get possession of something of limited quantity, or with two synergists working to a limited end. My finding from hearts is that they are synergists. I deduce that there are synergists elsewhere. I have called the two sources of energy, the kinesipheres.

Alcohol is a drug which decreases the part played by the one kinesiphere in excitation processes and enhances the part played by the other. Preconceived notions concerning how experiments should be done prevented observation of the facts in muscles, but man's uncontrolled experiments on himself revealed that alcohol did exert two different actions on his organ of mind. Accordingly to adjust what happened in brain to what was believed to happen in muscle, two anatomically distinct structures, higher and lower psychic centers, were imagined to exist in the brain in order to have two sources of energy for alcohol to act on. The new facts concerning both alcohol and muscle make these adjustments non-necessary. The brain acts as-a-whole, and its nerve cells each have two sources of energy, the kinesipheres. Hence, the actions of alcohol on conduct can now be considered to throw light on the parts played by the kinesipheres in mental processes.

The next item that may interest you is the discovery that the proposition of exciting a quiescent muscle or nerve to any activity at all is an entirely different proposition from that of stimulating a rhythmically active organ to greater activity. The difference is as great as that between the sparking of gases in a motor car's cylinders and accelerating the car itself. The existence of a difference had never previously been suspected. In addition, rhythmical structures are capable of showing their own

* Read at the Ellensburg Congress, 1935.

** 1) Burridge, Excitability, A Cardiac Study, Oxford Univ. Press, 1932.

2) Burridge, A New Physiology of Sensation, Oxford Univ. Press, 1932.

3) Burridge, A New Physiological Psychology, Arnold, London, 1933, and Williams & Wilkins, Baltimore.

4) Burridge, Alcohol and Anaesthesia, Williams & Norgate, London, 1934.

proper modes of behaviour, another fact never previously suspected. As a matter of academic interest you might imagine yourself to stimulate a rhythmical structure to greater activity and thus to evoke from it the behaviour typical of a rhythmical structure. The stimulation will obey, of course, the laws which govern the stimulation of rhythmical structures.

You have next to imagine yourself firmly believing that the inherently rhythmical structure which you stimulate is really one of inherent quiescence, and that its stimulation ought to find its parallels in the processes which accompany the act of exciting the members of the frog's muscle-nerve preparation by electric currents. Finally you know nothing of the behaviour of rhythmical structures except that they 'beat'.

The problem presented under such circumstances is that of adjusting the facts to the preconceived notions and there is no other course possible until the extra knowledge is available. None can deduce that a particular form of behaviour which he meets is the behaviour of a rhythmical structure unless he already knows that rhythmical structures behave in that way. Similarly, none can deduce that he is stimulating a rhythmical structure unless he knows the laws which govern the stimulation of rhythmical structures.

Acquaintance with the laws which govern the stimulation of rhythmical structures, and acquaintance with their behaviour have been gaps in the mental equipment of all the eminent physiologists of the present day. They have further all presumed the inherent quiescence of living tissues. In good faith and innocence they have met with rhythmical tissues and stimulated them to behave as such. Then full of the faith in inherent quiescence, they have puzzled out explanations as to how it could be that the tissue did not behave as it ought to behave if it were of the type they believed it to be. The task was as difficult as that of explaining the coincidence of a damaged motor car partly penetrating a brick wall from the bases or presumptions that motor cars have inherent quiescence and only move when pushed from behind.

The man who could produce a seemingly satisfactory explanation of such a coincidence from these presumptions would require to do much really hard thinking. His explanation would be, further, something in which he could take real pride. And, having achieved it, the last thing he would want to know would be that motor cars are automobiles. At any rate I find that the facts which I have discovered concerning rhythmical structures are exceedingly unwelcome. You could get some idea of this for yourself if you made a naive enquiry from a dozen or so of professed physiologists concerning what is known concerning the laws which govern the stimulation of rhythmical structures to greater activity, and what is known concerning the behaviour of a stimulated rhythmical structure.

As expressed by Sir Leonard Hill, the new theory develops the thesis that: 'The central neurons and sensory and organs are rhythmically acting colloidal systems with two sources of energy, viz., ADSORPTION reactions and changes of colloidal AGGREGATION. The proportions between the two sources of energy are capable of infinite variation; and their interaction produces response. The data of a sensation or idea are mediated through the first and conscious through the second source in the organ of mind.'

We can sum up the main issues as follows:

OLD BELIEFS:

1. That end organs and central neurons are excitable structures which are normally inactive until aroused to activity by an external agent termed the stimulus.
2. That the members of the muscle-nerve preparation possess a quality, excitability,

which is the same as that by which end-organs and central neurons react to stimulation from their environment.

3. That muscle and nerve contain definitely composed and unstable excitable substances which are detonated or shocked into activity or excitation, by the shock, or compression, conveyed to them by electric currents or by normal stimulation.

Instead of the hypothetical muscle-dynamite (Gowers) excitable tissues possess two kinds of potential energy which have been termed the KINESIPHORES. Since there are two of the latter, they are distinguished as A and B.

The Kinesiphores are really two ways in which the colloidal systems can manifest energy exchange, namely by what are termed adsorption reactions and colloidal aggregation changes.

The act of exciting is thus an act of addition (superimposition) rather than the act of striking which it has hitherto been commonly assumed to be. Stimuli become agents which can add (superimpose) kinesiphore energy to (on) colloidal systems.

A sensation is really an appreciable augmentation of the activity of a rhythmical structure.

It is unsafe to assume that the synapse is anything other than a semi-permeable membrane capable of mediating action at a distance.

What have before this been considered primary properties (excitability, functional capacity, etc.) are to be considered now as kinesiphore manifestations.

A missing factor from Freud's calculations is the necessary existence of a limit to the power of any organ of mind, a power which we have found to be derived from two sources of energy.

No information can be given about the nature of the psychic structure save that, whatever it may be, it has a limited capacity which will be denoted by the letter T.

NEW DOCTRINES:

1. That central neurons and end-organs are rhythmically active colloidal structures whose possessions in excitability determine their intrinsic activity only.

2. That rhythmically active colloidal structures possess a quality, responsiveness, a capacity to have their activities altered by environmental change, which so differs from excitability that the rhythmical structure with much excitability has little responsiveness.

3. That excitable tissues possess two sources of potential energy, the kinesiphores, whose interactions provide the dynamic energy for evoking responses.

4. That the proportions between the two interacting kinesiphores are capable of infinite variation.

5. That in the organ of mind consciousness is mediated through the one kinesiphore and the data of a sensation or idea through the other.

6. That every organ of mind has its own individual limit of effort derived from the two kinesiphores in such manner that the more of the one type of energy used, the less of the other can be used.

THE POINT TO APPRECIATE, THEREFORE, IS THAT NEW FACTS HAVE BEEN DISCOVERED WHICH ARE INCAPABLE OF BEING FITTED INTO WHAT HAS HITHERTO BEEN REGARDED AS SOUND SCIENTIFIC THEORY. NEW DOCTRINES HAVE ACCORDINGLY BEEN FORMULATED WITH WHICH THE FACTS ARE COMPATIBLE, AND SUCH ARE THOSE GIVEN ABOVE.

The workings of the mind ultimately depend on the properties of colloidal systems, and so become expressions of the activities of the two Kinesiphores.

H plus L equals T

where H is one kinesiphore, L the other, and T the normal maximum energy-effort of mind.

The pleasure-pain content of stimulation does not determine this result, only its strength (over-driving). Overwhelming joy can thus be as devastating to its recipient as overwhelming pain. But it happens that in this world the occasions for receiving the former are very, very few, whereas the occasions of the latter are many.

The integrative tendency is the only deus ex machina we shall introduce in this work, and he has only been introduced with the reservation that some day we expect him to be displaced. At present we can only sense dimly in his possibilities which we imagine will some day be found more definite. We hope also that the term, integration, will be found as sweet as dramatization.

The only way to stability would seem to be for the data of the ultra-cognizable to get linked up with some long-dead theory down in the infra-cognizable. The result would be the revival, as it were, to cognizable strength of something long previously infra-cognizable. The approach would be through gradual rhythm differences.

Possible variations from the normal are: 1. Variations in the capacity to have an augmentation produced at all. 2. Variations in the persistence of augmentations that have been produced. 3. Variations in the capacity to undergo changes of rhythm.

In addition, mixtures are possible. Each variation, further, is of twofold character, since it may be either in the direction of more than, or in the direction of less than normal.

There may occur: 1. Quickening all rhythms. 2. Slowing all rhythms. 3. Augmenting all amplitudes. 4. Decreasing all amplitudes.

The factor T is most important and the concept of adequate functions here, in a most important fashion. p. 127 (3).

The patient becomes exhausted through the neurosis, rather than acquires a neurosis because he is exhausted.

The issues are not of theory, but of fact.

See appendix (in 3) for the experimental facts upon which the theory lies.

(Note: The paper of Professor Burrige is presented here with only minor editorial corrections. However, it seems advisable to suggest to the serious reader that what Professor Burrige calls 'rhythm' is better described by the words 'dynamic configuration' or 'dynamic structure'; and when he uses the words, 'action at a distance' he really means 'action by contact', indispensable when we take the electro-colloidal point of view, or attitude.--A. Korzybski.)

A REPORT ON THE PSYCHOTHERAPEUTIC APPLICATION OF GENERAL SEMANTICS*

The University of Chicago, Health Service
March 17, 1937

Dear Count Alfred:

Some weeks ago you wrote asking for an appraisal of your work in Chicago during the past two years. This work involved the systematic presentation of General Semantics in two seminars -- one at International House in the spring of 1935 and one at Northwestern University in the summer of 1936 -- and the personal instruction of selected students and patients. Both Dr. Congdon and I are glad to give you our opinions of your work and have only hesitated to do so before this because of difficulties involved in making such estimations where well over a hundred individuals have been involved and so much time must elapse before it is valid to assume permanent beneficial results, among other things. Therefore, please consider this report in the nature of a "progress note", tentative, by no means a final statement. We expect to complete a more systematic appraisal of the clinical results of your methods of "extensionalization" for publication in the medical press soon as a sequel to my recently published article, "General Semantics", in the January 1937 issue of J.A.P.A.**which Dr. C. B. Farrar, the editor, asked me to write.

Clinically, as psychiatrists dissatisfied with "school" methods either because of their verbal esotericism or their time-energy-expense handicaps and forced by the exigencies of a large out-patient practice among young adults, we can say this:

With two years of experience as a background, during which time we have experimented in about one hundred cases with either a "pure" semantic technique or semantics in combination with "analytic" procedures, it appears certain that the technique is of unquestionable value in neuro-psychotherapy. We have found it especially useful in the handling of "cases" who seemed to reach an impasse with other procedures. It seems definite that under purely verbalistic management there is a point beyond which one cannot go with a verbalistic patient. (You are more aware than we are, of course, of the "verbal obsessionism" of the day, but it constitutes a specific problem and a barrier to older forms of therapy on a university campus.) In such cases the semantic approach, as we have used it, has proved astonishingly successful. In many cases the response of the patient has been not only sudden but dramatic, completely surprising us as therapists. It has happened repeatedly that the explanation of the multiordeinality of terms, along with the introduction of the multiordeinal mechanism concepts, has sufficed to put an end to the verbal battles "beloved" by patients who are often more confused than they are "resistant" in most cases. There follows, as a rule, a gain in insight with new formulations, new evaluations, new conduct, and, in general, marked improvement. Many times, the patient demonstrates what might be termed a "release of cortical activity" that not only stimulates him to further, independent, progress but is actually invigorating on neuro-physiological levels as evidenced by increase in body weight, circulatory improvement and so forth. He will very often develop new orientations of his own, which, precisely because they are his own, are vastly more effective for a sense of self-sufficiency necessary for "health" than the hypnotic adoption of orientations, evaluations, (similar of course because of the demands of gregarious human existence) which his therapist might give him under the old doctrinal methods. Often this marks the end of treatment and patient and neuro-psychiatrist find themselves as fellow stu-

* Not on the program of the Ellensburg Congress. (Cf. Chase, "Tyranny of Words", p. 86-87.) Reproduced by permission of the authors.

** American Journal of Psychiatry. (See Bibliographical List, under Campbell, L.G.)

dents or collaborators. In fact, this repeated therapeutic result has led to the spontaneous formation of a seminar in which our former patients contribute fully as much as we do to the correlation of different fields of science.

Often, the mere didactic presentation of the techniques of extensionalization, even the semantic "devices" alone, has been enough to "release" early memories, associations, which under ordinary procedures would not be produced until much later in the series of interviews due to "resistance", confusion and so forth. The elimination of a single identification, based on false-to-fact knowledge, doctrinal in origin often, has in our experience greatly relieved if not "cured" many painful situations of long standing. Many such patients had previously been treated by orthodox "psychotherapies" and it was obvious to us that a relatively simple issue had been clouded by such metaphysical speculation in a vain attempt to get at the structural facts. The new approach almost invariably appeals to the majority of these patients, and they seem to sense that "there is a way out" and manifest a definite eagerness to learn more. This has led to the seminar referred to above and the need for seminars such as you gave. Sleeplessness, anxiety-states, depressions, and hypochondriacal syndromes yield more quickly, we feel, than by our use of the older methods. We are at present pleasantly surprised by our results with early schizophrenics where, in a few cases, it has been possible to clear up the disturbing effects of hallucinations and delusions by the direct application of extensional analysis of the situation. The visuo-kinesthetic approach -- extensionalization at the silent level, by action -- has proved most useful and we are anxious to experiment further.

We are coming to the conclusion that a combination of group and private instruction or therapy will evolve. There is no doubt, that we have in General Semantics, a procedure of great merit in preventive work utilisable in the elementary schools as well as the colleges. It is our plan to give such a course to a group of freshmen selected at random next year in order to follow their university adaptations. We also hope to group our actual patients into seminars in order to work out a time-energy-saving form of therapy. Tentative experiments in this direction patently justify the procedure being introduced into a university health service on a larger scale. If it would be possible to have you give seminars over the years to deans and instructors there is no doubt in our minds that much of the need for psychiatrists in a university health service would be reduced. We are, after all, a product of the failure of adult society. It is appalling that many of our institutions of higher learning openly affirm the standardized delusions of the middle ages ("delusional" in the strict neuro-linguistic sense as they are) instead of presenting standards of evaluation based on contemporary science. If education were correctly orienting its products, psychiatrists, in the main, would be unnecessary. It would be a worthwhile human experiment to have you extensionalize the various experts and personnel officers of a college faculty and it is in this way, Dr. Congdon and I both feel, you could function most usefully.

Trusting that this report will suffice for your immediate purposes and assuring you of continued respect and collaboration from both of us, we are,

Douglas Gordon Campbell, M.D.
Assistant Clinical Professor of Psychiatry
Psychiatrist, Student Health Service, University of Chicago;
Consultant Physician, Cook County Psychopathic Hospital

Charles E. Congdon, M.D.
Clinical Instructor in Psychiatry, Loyola Medical School;
Psychiatrist, Student Health Service, University of Chicago;
Consultant Physician, Cook County Psychopathic Hospital

PRELIMINARY REPORT OF TWO CASES OF PSYCHOPATHIC PERSONALITY WITH CHRONIC
ALCOHOLISM TREATED BY THE KORZYBSKI METHOD*

By John G. Lynn, M.D., McLean Hospital, Waverly, Mass.**

A report of the effect of the use of General Semantics in the treatment of several cases of chronic alcoholism in individuals with psychopathic personalities is thought to be justified even at this premature date, and on this limited material, in view of the notorious refractoriness of such a type of patient to prevailing psychiatric and psychoanalytic therapeutic procedures. No general conclusions can be drawn from these, the first two patients of this kind the method has been applied to by anyone, so far as the author knows, but the exceedingly gratifying results to date are stimulating and suggest that it should be used on a larger number of patients of similar types, by workers in public and private institutions where more material is available. Until this is done on a grander scale, with the use of proper control groups, etc., no statistically valid general conclusions can be drawn regarding its effectiveness. If this paper serves to stimulate some such further research it will have fulfilled its purpose and the author will be happy.

In the presentation of the intimate details in the case histories of these two patients necessary in this discussion, theirs as well as the McLean Hospital's full cooperation has been obtained. For obvious reasons all names, dates and data relative to the two men have been changed where necessary to conceal their identity, but this in no way has detracted from the accurate presentation of the salient material of their histories which bear on our problem. Both patients have been asked to write personal letters to the author and to state frankly, briefly, and as clearly as possible what is their reaction towards General Semantics. The reply of each is appended to his respective case history as incorporated in this paper.

Patient A's story is that of a white male thirty-six years of age who was brought into the McLean Hospital in an intoxicated, disorderly state with the history of having been a more or less regular drinker of alcohol during the last ten years. His excesses have been so constant since 1932 and so productive of disturbance that his family finally in desperation sent him to our hospital. The salient points in his history are as follows:

He was born the only child in a substantial, god-fearing, comfortable, successful, New England family. His mother was an immature personality who dominated the household in a rather childish manner, through her nervous troubles, headaches, etc., with frequent spells of pouting and distemper. As a small boy the patient was his mother's "ruffled darling and perfect boy" who could do no wrong. Prior to puberty he preferred the company of his mother, older people and girls and was treated as a sissy by boys of his own age, yet his mother taught him that he was a superior individual and always made excuses for his failures in adjustment.

Despite the above background, he began making some progress in his social adaptations in grammar and high-school and by the age of eighteen he had obtained considerable popularity among his school mates but up to this time he had never had a date with a girl. He entered college and showed a definite and fairly successful effort towards emancipation from his mother by becoming a leader in college extra-curricular activities, a social "playboy" and a "lion" among the ladies. His academic standing suffered accordingly so that he was finally expelled from college at the end of the third year because of his low grades. For fifteen months he worked hard and did well in the employ of a

* Read at the Ellensburg Congress, 1935.

** Dr. Lynn's present address (1938) is Stamford, Conn.

financial concern and with satisfactory recommendations from his employers he tried to re-enter college again, only to be refused. It was at about this same time at the age of twenty-three that his mother's influence was instrumental in breaking up his engagement with the first girl he ever loved and it was a few months afterwards in 1932 that he began drinking on week-end parties and having for the first time in his life active heterosexual experiences. For nine years he remained working with a financial concern and doing fairly well despite his alcoholism and intermittent amorous affairs. All of the latter were with more strong-minded and mature types of women and did not develop very far because of lack of finances and his mother's influence, which was important as he continued to live at home. He lost his position in 1932 chiefly because of the financial depression. Since then he has been out of work and spent more and more of his time at home with his mother, feeling that she needed him and he her. He has not been self-supporting. The regression of his personality was vaguely realized at the time by the patient. His independent reaction and desire to adjust to manly responsibilities came into such painful conflict with what he felt to be his duty to his mother that he more and more attempted to obliterate the pain of the psychic battle by flight into alcoholism. Hence, his drinking while originally of a more social character has in the last few years become a continuous avenue of escape and more and more asocial, finally leading up to his being sent to this hospital by his family four months ago.

His personality and mental status at this time was briefly as follows:

A strong, alert-looking man, thirty-six years of age, neat and clean in his personal habits, composed and mentally clear. His attitude was co-operative, frank and open and he possessed a most pleasing form of address, buoyant and spontaneous with much humor and a contagious laugh. His conversation was engagingly vivacious and showed no abnormalities of stream or content. His sensorium was clear and he showed much keenness of memory for recent and remote events. His intelligence in the terms of the Army Alpha Test, Form 9, was found to be nineteen years, three months, with an I. Q. of 120. He was extremely energetic and hyperactive with frequent mood swings from one of buoyant elation to one of irritability and antagonism. He was critical in the extreme of everyone and everything about him, complaining of his food, the service, the patients and the nurses. Very often he would become angry and peevish at not being able to have his own way or at not being permitted to take precedence over other patients. His behaviour was marked by much impulsiveness with frequent outbursts of anger, all of which caused much complaint from other patients as well as comment from the nursing staff.

However, despite the above, he realized his own personal inadequacy and adjustment difficulties and expressed himself willing to remain in the hospital and to follow any constructive program of self-development we might give him. A didactic diagnosis of psychopathic personality, mixed type without psychosis, was made by the psychiatric staff.

Introductory talks were given him regarding the scope, method and purpose of General Semantics with particular emphasis on its application and use in aiding in the solution of his own personal problems. His daily program was made to include four hours of study of "Science and Sanity" by Alfred Korzybski with hour-long evening conferences with myself as well as the routine occupational therapy, gymnasium activities, hydrotherapy and other customary routine procedures given most of the patients belonging to this general class.

His improvement in adjustment and his personality maturity during his two months' stay in this hospital was spectacular. The patient became, as he progressed, more and more enthusiastic over the subject matter. At the time of his discharge two months ago his demeanor towards the nurses, patients, etc., had changed to one of tolerance, in-

sight and amiability. He has lost his tendency to impulsive and irritable behaviour, as a result of his persistent drill in delaying his reactions in all situations. His gain in self-confidence, self-control, together with his substitution of extensional for intensional thinking, was most profound. His ability to solve his own problems and to avoid petty verbal tangles which had previously so disturbed him should be mentioned. During the last three weeks of his stay here he was given full parole privileges and went and came from town as he desired. There was no sign of any relapse into his previous inebriate habits. On the contrary he spent his spare moments so effectively that he secured a position with a large business house, which he has held and done good work in, since his discharge from the institution two months ago. He has kept in touch with us at weekly intervals and has continued his progress, receiving commendations on his work and apparently very happy in his new-found adjustment.

Technique of application of General Semantics in the treatment of the Patients A, and B, was so similar that it will be taken up in more detail later on. The following is a letter just received from the patient and reporting his progress and reactions:

Boston, Mass.
February 20, 1935

Dr. John G. Lynn, III,
Belmont, Mass.

Dear Dr. Lynn:

I am delighted to have this opportunity to express to you and through you to others, my deep appreciation of what Semantics has done and is doing for me, and as you and other people to whom the case is interesting and who are less familiar with the story look through the following paragraphs you, too, will understand in some measure at least, why I am so grateful. Kindly bear in mind that this is written by a layman and is in no way a treatise.

The case history has been covered, I believe, by you Doctor, so I shall not go over that ground. Of foremost importance in my case the chief negative factor in my life, alcoholism, has been brought completely under subjugation, due to the gaining of cortical control through Semantics. I have subjected myself to the most extreme tests and have come through with flying colors as numerous of my friends can and will testify.

In addition to this achievement (for believe me it is an achievement) may I mention a few other deep seated changes in my personality and general attitude:

I am getting far, far more out of life in every way than I ever did before studying Semantics. I feel myself and am told by others that my personality as a whole has greatly improved. I have banished "worry" because I have learned to "go back to the facts" and abstract from those rather than jump to ideas first and try to make them fit the facts. I think much more clearly and accurately through the Semantic method. I have very definitely matured through cortical control. I have achieved a far better understanding and tolerance of my fellow-beings (their ideas and viewpoints) which has proved invaluable in business as those who know my recent record of achievement in that line can testify. I have been able to confer with dozens of our biggest business and professional men since leaving you without the usual feeling of "inferiority" that holds back so many people and I have scored high in nearly all cases. Such a readjustment alone fully justifies Semantics to me. I have avoided hundreds of petty daily disputes through the Semantic method of ascertaining facts, defining terms to myself, and abstracting therefrom. I have a much better sense of survival values. I have increased

my self-control through "delayed reaction". I have been flattered by having some of our most successful doctors ask me to help on certain of their cases and furthermore, several of my friends have come to me for help. Having made Semantics a part of my own life I am now having the pleasure of furthering its study among many others.

Need I go on? The benefits achieved in my case alone through study of K's Revolutionary Work greatly clarified by your thorough and able interpretation and help more than justify to me, at least, the furtherance of the application of the Semantic method in all lines of Human endeavor.

With deepest appreciation, I remain,

Your friend,

(Patient A's signature)

P.S. You will understand that you have my fullest permission to use this personal letter as well as the case material in the hospital in whatever way your discretion may dictate.

Patient B. is a white male, thirty-three years of age on his first admission to the McLean Hospital January 1932. At the present date he is thirty-six.

The chief complaint at that time was chronic alcoholism of increasing severity since 1919 with more or less continuous drinking since 1931 accompanied by such excitability, instability and unruliness that he had recently committed a homicidal assault on a man, which was the precipitating factor in having him sent to this hospital.

His life history is so wild, active, and full of material as to make condensation difficult but is roughly as follows:

His family is an old and distinguished one of much wealth and position and of healthy stock. The patient was the second in a household of four siblings, two girls and two boys. The father has always ruled the home with an extremely indulgent but iron hand. The children were treated as babies even when mature and always pampered in every way wealth and solicitous parents could manage. The home atmosphere was apparently not a very happy one because of constant criticism by the parents of their children and much friction as a result, but unlike his other brothers and sisters, who more or less bowed to their parents' rule, the patient rebelled at an early age. An important factor causing this was on one occasion his having observed both of them unfaithful to each other. By the age of thirteen this revolt against their authority had crystallized definitely and he attempted to oppose and embarrass them in every way so that eventually he was sent to two military schools in an endeavor to "tame" him. He was dismissed from both of these because of incorrigibility and defiance of all rules, with moral delinquency and poor academic standing. He finally enlisted in the United States Army in 1917 and after seeing action in France he was honorably discharged in 1919 and then went into business with his father, but again they clashed and argued continually. The patient had none of the qualities which would fit him for a business career. He lacked reliability, stability and later was guilty of passing bad checks and was charged with obtaining funds to the extent of \$50,000. under false pretenses. His father paid his debts, got him out of trouble, etc., hoping that he would reform. All of this time he had been drinking continually on the average of one quart of liquor a day. While usually a cheerful, optimistic "playboy" with much self-assertion and intolerance he was occasionally subject to such fits of rage as to threaten physical injury to his father for disagreeing with him. His antagonism to his mother was almost as marked. At the age of twenty-five he married. On his honeymoon his wife confessed that she had married him for his money and after that their relations including sexual ones were always most unsatisfactory. He has actually found her to be unfaithful to him on several occasions

and while intoxicated has threatened to kill her and her two children. Shortly before his admission he committed a homicidal assault on a man and entered this hospital incarcerated on his first admission in January 1932.

At this time he was found to be suffering from a chronic max-sinusitis with anaesthesia of the left side of his face following a ganglionectomy for tic douloureux. Pain attending his physical condition certainly aggravated his marked tendency to instability and impulsiveness. These factors caused as a consequence much impairment of thinking and judgment, despite his having an I. Q. of 115 as estimated by Army Alpha Form 5. He was resentful of all authority, inconsistent, undependable, and untruthful with poor insight.

His career here during his first two years' stay was a tumultuous and most difficult one for all concerned. There were at the beginning two attempted suicides associated with considerable depression. His wife successfully obtained a divorce on the grounds of cruelty and incompatibility. This further disturbed the patient. He fought with nurses, broke windows, violated his parole with drinking and disorderly conduct on every opportunity. This two-year period was also marked by a thorough-going psychoanalysis in the hands of a very competent analyst. In all honesty and fairness, it must be stated here that the patient was helped definitely by the analysis in that it gave him much needed insight into the origin of his asocial reactions. As a consequence he seemed somewhat less violent and untidy and more co-operative but continued to remain thoroughly unreliable, unstable and broke his parole by drinking whenever he had a chance.

In January 1934 he was discharged improved, in order that he might attend the funeral of his mother. While at home he commenced drinking again and became such a problem to his father that within a month he was returned to this hospital. His second stay of five months here was a slightly milder repetition of his previous record of unstable, erratic and violent activity. He was unable to live up to any of his parole obligations and persisted in drinking by hook or crook. Finally he was discharged unimproved to the custody of his father in July 1934.

For several months he did fairly well playing tennis, golf, swimming, etc., drinking but in no great excess and generally succeeding in keeping out of trouble, only to relapse back into his old habits of extreme inebriation and disorderly behavior which climaxed an impulsive attempted suicide through running his car at a gate post. It failed without injury to himself and he at once voluntarily returned here for his third, last and present admission on Oct. 7, 1934.

By this time he was thirty-six years of age. He was immediately assigned to the writer, who at an early date with full co-operation of the patient and the hospital began his non-Aristotelian training in General Semantics, using the Structural Differential and the method as outlined in "Science and Sanity" pages 471-477. This training with Patient B. was commenced at the same time as with Patient A., approximately four months ago. The general procedure followed in the presentation and teaching of the subject was similar in each case and will be discussed under a later paragraph. Patient B's progress was definitely slower than patient A's because of his more markedly disorganized personality, his lower I. Q., less education and much greater resistance with a tendency to argue continually with resulting semantic blockages. The first month was the hardest. Thereafter his progress was more rapid. He worked hard on the average of several hours a day studying the assignments in "Science and Sanity" given him, using the Structural Differential constantly as instructed. On November 17, 1934, the patient was given ground parole, to which he adjusted very well, so that by December 1 he was given privileges to go in town. Since that time he has been constantly free to come and go from the hospital with the sole necessity of reporting here by certain hours.

Only on one occasion has he failed to live up to every obligation expected of him and the most careful observation of his behaviour on the part of the nurses and physicians has found no signs of regression to his former drinking habits. He has been so anxious to show his ability to assume responsibilities and live up to his obligations that on one occasion despite a severe snow storm which delayed traffic for many hours he waded through snow and fought a raging wind to return here by eleven o'clock as agreed. The nurses, in the last few months, have long since ceased complaining of his intolerance to other patients. The patient himself says that they no longer irritate him as previously, that he has learned the tremendous value of delaying his reactions and thereby introducing automatically cortical control to a degree that he has never had before. In addition he feels that he is developing a positive set of non-elemental standards and orientations towards life that are scientifically and biologically sound, his attitude has changed from a negative one of fighting against all prevailing standards to a more positive one of a desire to fight for his newer points of view and life orientations. His personal remarks on this matter follow in a letter written to the author:

February 21, 1935

Dear Doctor Lynn:

In compliance with your request to write a report on my progress since I have been at McLean, I am happy to submit the following statement.

As you know I have always been a highly emotional, unstable person with signal reactions to most of the factors in my surroundings without any thought for the result of those reactions on myself or society. I have never planned or thought for the future and lived only for the immediate present. As a consequence of all this I have suffered in many unpleasant as well as dangerous situations which were chiefly caused by my never having "delayed my reactions" long enough to think of consequences remote and immediate.

The McLean Hospital in which I have been a patient for about three years is fortunately for me one of the best of its kind. Its chief psychiatrist, Dr. Kenneth J. Tillotson has always been open-minded, seeking to improve the therapeutic facilities here and making them fit the individual patient's needs. Under Dr. Tillotson's directions, time and skill of the best has been exerted by many psychiatrists in an effort to reorganize my relatively disorganized personality. This included my being psychoanalysed by one of the best men in the field. I derived much understanding insight from the analysis. The situations of my early life responsible for the production of my signal reaction patterns became clear. I believe this insight to have been a very important groundwork and preparation for my study of Semantics. However, it did not provide that degree of stability, cortical control, as well as a satisfactory way of life, that would subsequently enable me to consistently follow an ordered existence and constructive work program. My emotional instability, impulsiveness and tendency to escape from it all through alcoholism still remained. Luckily for me again the hospital, just prior to my present and last admission, obtained your services so that following my entrance I was most happy to co-operate with you in your plan of self-development through the study of Alfred Korzybski's system and methods on General Semantics.

The work began about four months ago. During the first thirty days it seemed that what little progress was made was slow and exasperating. This was especially true of the theoretical material. The new terminologies, ideas, etc., were hard for me to grasp (since I joined the army before finishing high school). Another handicap was my habitual antagonism to all authority, which made me argue endlessly and so delay my formation of new habits. However, due to your persistence, patience and guidance in study and practice I slowly began developing the habit of "delaying my reactions" especially through drill

in the use of the Structural Differential and elimination of the "is" of identity. Furthermore, I began to reorient myself extensionally. The last three months has brought a real change in life to me through re-canalization. I am learning more and more to wait a minute and weigh any problem or situation--to observe the sense facts first and abstract therefrom--to see if verbal descriptions are accurate and adequate and finally to use the non-Aristotelian principles of 1. non-elementalism, 2. non-identity, 3. non-illness as maps of orientation in life, making for a more flexible and adequate adjustment. Now I can handle my own problems much better and with less help than some months ago through the knowledge and balance I received from the Semantic training. To date I have been able to go ahead and take other and more academic courses in a field in which I hope to become eventually established. I have derived real satisfaction from doing some constructive work therein. My studies in my new field and in Semantics have so monopolized my time and interests that alcohol no longer has its old appeal. Neither does it seem to me to be a wise thing to directly by its use weaken that degree of cortical control that I have with so much effort acquired.

Altogether I am much more stable, better organized and I believe a more reliable person than ever before. From my purposeless, disintegrated, unhappy state of insecurity of four months ago I have reached today a more purposeful, better integrated and a more consistently happy state. My present peace of mind and greater self-respect with accompanying feeling of security is a new, long-wished-for and very happy experience for me. I feel that I am just at the beginning of a new life with a new outlook and a purpose ahead of me.

Gretfully,

(Signed by Patient B.)

METHOD OF SEMANTIC TRAINING USED WITH BOTH PATIENTS

In view of the fact that both of the patients were mature intelligent individuals, it was felt wise to incorporate in their education considerable theoretical material. To this end they were given assignments in "Science and Sanity" for their daily study and were seen in conference by myself for an hour six evenings a week. In these periods the subject matter was clarified for them and its manifold applications in orienting and re-evaluating their own personal life situations and problems were shown. All interviews with them were private but a uniformity of program was maintained in both cases. The first few conferences were devoted to facilitating the grasping as well as to clarifying the understanding of Korzybski's contributions and system. The development of the subject was pursued roughly by the same road that Korzybski himself took and so clearly presented in "Manhood of Humanity" (Dutton and Co.) in 1921, the approach being an evolutionary one. A brief summary of the introductory manner of presentation of the subject to them is as follows:

Vegetable life forms have as their characteristic total dominant behaviour function the ability to bind solar energy and simple inorganic constituents from the earth and air into the complex organic, inanimate tissue making up their body structure. In brief we can say that plants have characteristically "one degree of freedom" only or can expand their activity in one dimension alone. Korzybski labels then the chemical and solar-energy-binding class of life.

For the sake of obtaining a sharp contrast we will proceed in our study by means of a long phylogetical jump over transitional intermediary forms and next study the animal level. We see then, they have in common with vegetables, chemical-binding functions mediated by their vegetative visceral organs, etc. What then is the total function that uniquely and sharply distinguishes the animal from the plant? It is his ability to move

about in territory, to compete in space for food, etc. This new function of autonomous locomotion is made possible by the structural phylo-genetic emergent of a higher order which mediates the spacial co-ordination of the organism. In the adult beast this senso-neuro-motor mechanism dominates the more primitive mechanisms and hence correspondingly changes the total behaviour picture as compared to plants. Animals move and fight in accordance with the bloody law of the talon, "survival of the fittest" to live and compete in space for the gifts of nature. Through the extension of their activities into a second dimension--space, they have organismally acquired an additional or "second degree of freedom". Hence, in terms of their characteristic and defining function, we can label animals as belonging to the space-binding class of life.

Is man an animal? Korzybski's answer is emphatically "no"! Human behaviour can no more be described in terms of animal behaviour than animal behaviour can be determined in terms of plant behaviour. Manifestly we have in common with animals the ability to take in food as well as the function of moving and competing in space. What then is the specific, unique and characteristic form of total-behaviour that as a phylo-genetic emergent in man sharply differentiates him from the animal? One man can capitalize and profit by the vast experience and labors in time of the billions of dead men of past generations as well as that of the millions of his living contemporaries. An animal in experience and wealth starts life always where his parents started. Relatively he is non-accumulative. Culturally man can start life where his parents left off. Humans are therefore rapidly accumulative. The knowledge and wealth of nations is a testimonial. This ability of man to accumulate material wealth, experience, etc., and then in a symbolic form (money, securities, knowledge, etc.,) pass it on to other individuals in the same or in the next generation, is the unique prerogative of humans. Quoting Korzybski, "We become the inheritors of the past, the creators of the present and the trustees for the future." It is all possible because man is a member of a class of life that has evolved an adjustment mechanism of higher order than the animal. This mediates not the spacial but the temporal co-ordination of the organism. This newly emergent structure and function peculiar to man is inherent in our outer extra one-quarter inch of super-granular cortical layers and certain complex associational tracts. These structures comprise in the main neuro-symbolic and linguistic mechanisms. In the adult human this, the outer cortex, etc., is the most recent structure to phylo-genetically emerge as well as the last to onto-genetically mature (16-18) years). It dominates our more primitive vegetative and animal mechanisms and has correspondingly changed their total behaviour picture. We have thereby extended our activity into a third dimension--time. We have acquired in addition to our more ancient first two, a "third degree of freedom". In the study of animals we have to consider only two co-ordinates, namely chemistry and, most important, their activities in space; whereas in the study of humans we have to study three co-ordinates, three capacities, chemistry, activity in space, but especially activities in time. Hence, in terms of that unique and defining characteristic which we possess alone in the natural world, Korzybski labels man the symbol-accumulating or time-binding class of life.

To attempt to measure animal behaviour in terms of chemical physical laws governing plant behaviour is like an attempt to measure square acres in terms of linear feet. It is simply a scientific stupidity. Similarly an attempt to measure human symbolic temporal responses in terms of animal signalic spacial reactions is unfortunately not only a scientific stupidity but also a human tragedy. The facts are that our existing so-called sciences of human behaviour are attempting to do mostly this. They are based fundamentally on the premise, implied or stated, that man is a kind of highly complex glorified space-binder or animal. In current psychology we study chiefly spacial co-ordinating mechanisms such as reflexes, instincts, etc., important but not specific for man. In economics we hear much talk of "pig-trough theories", laws of supply and demand, competition, etc., which may apply to an animal class of life dependent upon free gifts of nature for food and shelter and unable to produce these values artificially through

co-operation and toil as humans can. Nations base their international policies on the theory that "possession is nine points of the law", "might makes right", etc. Such a natural law as "survival of the fittest" for animals means survival in space. The result is fight and competition for limited territory containing food and resources, the "free gifts of nature", with survival of the strongest and most selfish, profiteering and exploitation and waste of natural resources. Such a law to be a natural law for humans must, as Korzybski points out, be changed to apply to the human dimension and obviously would be "survival of the fittest in time". This results in research and co-operation for the artificial production of food, shelter, etc., with survival of the wisest, most excellent, most unselfish and most creative of social, scientific, artistic, etc., values for the benefit of mankind.

It was pointed out to the patients that our main object was the direct neurological training of this symbolic, temporal, co-ordinating mechanism which they possessed as their human birthright and through the mis-training of which they have reached their present state of inadequacy and asocial maladjustment.

The introductory talk was thought necessary in order to clarify in the patient's mind the place of man in the natural world and to sharply define his unique and specific symbolic, time-binding activities by virtue of which he is called man. The next step was to point out that if they as humans would endeavor to live up to their greatest potentialities as humans and not merely live down to the level of being a poor imitation of an animal or vegetable, they must through a direct neurological training of a special type develop their temporal co-ordinating Semantic mechanisms; that it was to be expected, as they improve through Semantic training the efficiency and integrated activity of their time-binding mechanisms, that automatically they would develop more cortical dominance and control over their total behaviour patterns and so improve their adjustment and personality efficiency.

It was further explained that their chief troubles in adjustment to this date were due precisely to the fact that literally they copied animals in their impulsive signal reactions, which, while of survival value to animals in an animal special environment, were definitely of non-survival value to them as humans in a human environment. As a consequence they were sent to this hospital for shelter and re-education as well as to protect society. They were told further that neurologically speaking they had simply never learned to delay their reactions long enough to permit higher cortical time-co-ordinating mechanisms to interfere in their behaviour. As a result almost invariably all their impulsive, emotional reactions might serve to give a momentary satisfaction in spacial adjustment but invariably as signal reactions failed to have adaptive value over any period of time. They, as physical athletes, could not be expected to make adequate spacial adjustments in complex athletic activities without complex training in proper use of their spacial co-ordinating neuro-muscular mechanisms. Similarly they could not be expected to be able to co-ordinate their activities to survive over any great period of time in this complex society of today unless their temporal, co-ordinating, neuro-semantic mechanisms were trained and trained adequately so that as an adaptive mechanism specific and unique for man it could successfully dominate and condition the manner of response of all of their levels of integration. Such a Semantic training would give to them the ability to live a well-adjusted, happy, consistent life with a greater ease of social adjustment and greater ability to do constructive and creative work in any field of endeavor they should choose.

The program of training by direct neurological means their neuro-Semantic cortical mechanisms was then outlined to them and followed faithfully. It consists of:

First - A thorough-going and persistent non-Aristotelian training, using the method outlined by Korzybski in "Science and Sanity", pp. 471-477.

Second - Daily assignments for study in "Science and Sanity".

Third - An hour's conference with each patient separately six evenings a week, over a period of two months with Patient A. and three months with Patient B.

Four - They were persistently taught to be silent on the objective level and so more and more to avoid the identifying of words with things.

Five - The Structural Differential was brought into the picture as early as possible and its significance as an instrument for non-Aristotelian training explained and demonstrated.

Six - The patients were drilled in the use of the Differential to develop habits of delaying reactions and to acquire a feeling of non-allness and non-identity and so to become conscious of different levels of abstraction.

Seven - The subject matter of "Science and Sanity" was discussed and elucidated for them and they were constantly encouraged to apply the new knowledge, new insight and new non-Aristotelian habits to the clarification and solution of their own problems.

Eight - Finally, after Patient A. had had two months and Patient B. three months of such training, they were encouraged to take up study and work in a field of endeavor which they might hope to make their own and continue in after discharge from the hospital.

Summary:

Our Objective has been to attempt to improve the adjustment to life and so eliminate the habit of chronic alcoholism of many years' standing, in two patients with psychopathic personalities.

The Method Used was persistent, daily, direct, neuro-linguistic extensional training in delaying their reactions; in drill with the Structural Differential; in eliminating false-to-fact intensional orientations; and in establishing extensional true-to-fact orientations, etc. The empirical work was supplemented by study and discussion of "Science and Sanity", with the constant application of the new extensional method and non-Aristotelian points of view to the solution of their own problems.

Results After Four Months

1. They showed marked decrease in impulsive, erratic reactions and corresponding increase in stability, self-control and consistent behaviour, productive of:

2. An increase in honesty and dependability, with a manifest desire to live up to their parole and other obligations, and success in doing so;

3. A marked improvement in the harmony of their relations with nurses and with other patients;

4. A definite development of greater ability by both patients to extensionally analyse, discuss, and solve their own adjustment problems with less and less assistance from the instructor.

5. With the exception of several drinks taken by Patient A. as a personal experi-

ment one month ago and done with the writer's knowledge, there has been no return to date in either patient of previous drinking habits. During the last three months both have had ample opportunity to indulge if they so desired.

6. Patient A. on his own initiative secured, and has successfully held with much commendation, a responsible position with a large concern during the last two months. He has lived outside of the hospital and has reported his progress to the physician weekly.

7. Patient B. within the last two weeks has taken up and applied himself diligently and effectively to a course of study in Aerial Photography mapping and surveying, in which he plans later to enter professionally.

8. Both patients report a peace of mind, feeling of security and self-confidence, with a new interest and purpose in life, never experienced before.

CONCLUSIONS:

1. The Korzybski method of direct, neuro-linguistic, extensional non-Aristotelian training, using the Structural Differential, has proven definitely successful during the last four months, in developing greater cortical, inhibitory control, in restoring nervous balance and in the elimination of tendency to inebriation, etc., in two men of unstable psychopathic personalities.

2. In view of the success of the method in so markedly improving the adaptation of these two patients suffering with maladjustment difficulties of a type hitherto notoriously refractory to any prevailing form of therapy, it is felt that the Korzybski technique should be tried on a series of such cases in order to ascertain its value as a possible standard procedure in the treatment of alcoholics and psychopaths.

3. Furthermore, in contrast to the older and more specific remedies, the method, in its essential feature, is so general as to suggest at once that it should be seriously considered and tried as a possible form of group therapy, badly needed in psychiatry today.

NEURO-LINGUISTIC AND NEURO-SEMANTIC FACTORS OF CHILD DEVELOPMENT

By Douglas Gordon Campbell, M. D.*

Human-biology includes and synthesizes many basic sciences and by necessity differs from animal biology. Until quite recently there has existed an arbitrary separation of these sciences into so-called 'physical' ("material") and 'psychological' ("mental") groups, a division which is reflected in clinical practice by use of the terms 'organic' and 'functional' and a corresponding artificial delimitation of those fields of medical practice engaged in by physicians and surgeons on the one hand and neuro-psychiatrists on the other. The development of these two broad departments of medical theory and practice has been influenced by traditional assumptions having their origin in medical

* (1) Assistant Clinical Professor of Psychiatry, University of Chicago; (2) From the department of Student Health; (3) Abstracted from address to Chicago Pediatric Society, Jan. 18, 1938. (Cf. Proc. Inst. Med. Chicago, 1938: 12, 119 for 'abstract'). Reproduced by permission of the author.

antiquity and frequently spoken of in contemporary medical parlance as "sound empiricism" versus "metaphysical speculation". In such a conflict we recognize the familiar dichotomy between 'body' and 'mind'. The sciences to date, have supplied sufficient empirical data to show that this problem is an artificial one created by the speculations of antecedent generations of human beings who were not in possession of scientific means of investigation of so-called 'natural phenomena', including the activities of the human nervous systems observing those phenomena. Thus, at macroscopic, pre-scientific levels of observation there are apparent separations between organisms and their environments, between 'thoughts' and 'actions', between 'stimulus' and 'response', etc., which at microscopic and sub-microscopic levels of investigation are found not to exist. At these contemporary scientific levels of investigation we have formed the concepts "organism-as-a-whole", 'organismic-environmental unity', 'unified-field theory', 'plenum' and others from the various descriptive sciences; our notions of 'causality' have changed from the evaluations 'cause and effect' (which is dichotomous and too limiting) to 'series of events' (which implies the participation of indefinitely many factors). Although some medical men, and other human-biologists (sometimes called psychobiologists) have accepted these new scientific orientations in their own specialties of research or practice they have frequently had great difficulty in conveying their knowledge to students and others because of linguistic handicaps. This is particularly true of modern neuro-psychiatry, the literature of which is replete with verbiage belonging to old 'psychologies' and pre-scientific metaphysical doctrines. The neuro-psychiatrist deals no less with the human organism-as-a-whole reacting to environmental factors both inside and outside the 'skin' of that individual than the pediatrician but he does pay particular attention to those factors of adaptation connected with the integrative functioning of human nervous systems.

In order to make the observations of modern neuro-psychiatry available to other specialists it becomes necessary to discard much obsolete verbiage and theory and to use a precise scientific language in which the terminology and its structure are similar to those of the empirical facts. In the present article the author will attempt to present some recent developments in neuro-psychiatry which are related to child development (and therefore to modern pediatrics), in a terminology which is neurological rather than 'psychological' and designed to be both differentiating and integrative in structure as is the language of contemporary mathematics. Certain specific orthographical and syntactical devices will be used. Quotation marks will be freely applied to words the meanings of which are traditional but inappropriate today, and to terms where the extensional contexts are not clear. Hyphens will be used between words to represent interconnected processes and relationships which at empirical levels are inseparable. The word etcetera with its implications of incompleteness of description and the process character of the happenings which are being described will be replaced, in the main, by the use of double non-aristotelian punctuation, say, a period preceded or followed by the type of punctuation conventionally used in sentence structure, e.g., '.,', '.,.', for 'etc.'. This is to avoid the unsightliness of the correct and yet unavoidable repetitious use of the term 'etcetera' and its equivalent expressions.

Concerned primarily with the harmonious development of the immature human organism from birth, through infancy and childhood toward a goal of productive integration with other human beings as an adult organism, the pediatrician has to manage therapeutically and eliminate preventively factors in the environment of childhood which belong more to its psycho-social than to its physico-biological aspects. And the neuro-psychiatrist, whatever the nature of his practice, realizes the enormous role of early home and school education in the production of neuroses and psychoses and other forms of mal-adjustment in childhood, adolescence and maturity. Disturbances of the orderly course of development of the human organism from its larval to mature forms of integration with its environment appear clinically as the persistence of, or regression to, less mature or even infantile forms of adaptation so that we may speak of late of infantilism

as the fundamental and common denominator of various types of psychopathology. As the pediatrician deals with human deviancy in its incipient stages, when the learning process is most active, and the neuro-psychiatrist treats, in the main, the end-results of such early deviancy their fruitful collaboration along with professional educators and parents becomes essential for the prevention of adult infantilism and the production of correctly-oriented, mature adult, human organisms.

There are sharp differences, as well as similarities, between the environments of animals and those of humans. These differences are a product of the anatomico-physiological differences between animal and human nervous systems. Through the integrative activities of the nervous system and related structures the organism-as-a-whole adapts an internal field of activities to an external field of activities. As has been shown by Child and others, nervous systems, whatever their degree of complexity, have had a common origin in the specialization and structuralization of the irritable, conductive and motile functions of the colloidal protoplasm. Stimulation of one area of a unitary mass of protoplasm by suitable physico-chemical agents produces electro-negative., alterations which establish polarity of the tissue through a decremental gradient of transmission toward an opposite, electro-positive pole. Thus a rostral-caudal axis of the organism is established with higher rates of metabolism, irritability, growth., at the head end. At this biological level the organism orients itself in its environment through physico-chemical, electro-colloidal mechanisms and it is misleadingly schematic to speak of one as if independent of the other. We are actually dealing at even the simplest known occurrences of the organism-in-the-environment with a unified field of physico-chemical relations capable of adequate description at present only by the limited mathematical language of the biophysicist, and the more general and workable language of general semantics. At multi-cellular levels of evolution these physico-chemical colloidal processes producing orientations, axiations, adaptations., have become structuralized as specialized cells--receptors, conductors, effectors.,. Further up the evolutionary scale we recognize nervous systems ranging from primitive nerve-nets capable of mediating only diffuse, mass-reactions, to the adult human type of nervous system where encephalization makes it potentially capable of mediating highly discriminatory but integrated, responses of the organism-as-a-whole-in-its-environment.

At many levels of evolution there is some modification of the environment by the organism, through the mediation of the nervous system, and the amount and kind of modification might be scaled proportionately to the scale of structural complexity of the various types of nervous systems in the biological series. Such a scale of environment selection and modification by organisms, if plotted as a curve, would show striking acceleration at the human end of the scale. Because of this fact, that human organisms have such great capabilities to select and alter their own environments, in turn being influenced in their behavior by the environmental modifications they have produced, human-biology differs from all sub-human biology as strikingly as solid geometry differs from plane geometry through the addition of another dimension.

This new dimension involved in human-biology is due to the capacity of human nervous systems to produce forms of representation called symbolism. By means of symbolism communication between living human organisms is not only greatly facilitated in comparison with animal communication but the experience of one generation of human beings becomes transmissible, cumulative and effective for the adaptive needs of other generations. Symbols range in type from dynamic forms of representation such as postures, gestures, vocal sounds., dependant upon living effector mechanisms for their production to static representations such as the plastic arts, written words, mathematical formulas., which, because they are extra-neural, are capable of independent existence. Collective or racial experience may thus be accumulated and appears as various types of symbol-systems known as folklores, traditions, beliefs, 'philosophies', cosmologies., and in the forms of literature, the arts and scientific formulations.,. Into such sym-

hol-systems human infants are born. Through primary education infants may acquire in a few years of development the adaptive experience of previous generations. Further development into adulthood makes possible the application of techniques of modern scientific investigations, by means of which these phyletic storehouses of knowledge may be revised, supplemented and recorded for posterity. Products of human nervous systems called symbols can influence contemporary or future nervous systems because of their meanings, significances, evaluations. This process of symbolization, because of its cumulative human character which makes so-called 'progress' possible, has been labelled by Korzybski, time-binding. The human neo-pallium might be considered the neuro-linguistic and to a large extent neuro-semantic (evaluational) organ of time-binding; its contribution to the unified functioning of the nervous system making symbolization and the building of a symbolic environment possible. Through such agencies human beings may so profoundly modify their 'material' environments that adaptation to physico-chemical events depends to a large extent upon the evaluation of symbolic values.

Symbolization, and so evaluation, depends upon neurological mechanisms which, in principle at least, are fairly well known. The human nervous system works as an integrated whole and is hierarchically arranged in so-called centres or levels, such, that higher levels of integration control and modify the activities of lower levels. In the phylogenetic series we witness encephalization so that at human levels of evolution the neo-pallium becomes the highest neurological centre, integrating, 'inhibiting', the activities of lower levels of the neuraxis in the interest of the welfare of the organism-in-its-environment. Phylogenetically older pathways, mechanisms or levels such as the midbrain centres become subservient to cortical structures from whose dominance they may be released under pathological conditions which interfere with the functioning of those higher centres. The release of function of such older, more primitive, neural mechanisms is familiar to us in the symptomatology of the epilepsies, degenerative cortical diseases, and in the neuroses and psychoses, to mention only a few. Ontogenetically, we witness the process of encephalization in the development of each child and it is not without great importance for physicians and educators alike to realize that the human nervous system is structurally immature at birth, develops more slowly than animal nervous systems, is not fully mature until approximately eighteen years of age. Evidence from electro-encephalography seems to indicate that cortical centres are in abeyance until approximately the fifth year of life; clinically we observe the struggle between the sensori-motor mechanisms of mid-brain levels and those of cortical levels late into adolescence. It is apparent then, that the cortical mechanisms necessary for optimum adaptation into the symbolic complexities of a human adult environment are not available to the infant and only incompletely to the adolescent human organism. The child's nervous system is unable to evaluate symbols which represent the higher order abstractions made by antecedent or contemporary adults.

Working as a whole, as it does, the adult human nervous system abstracts experiences from its external (or internal) environment at neuro-sensory and thalamic levels and probably makes an indefinite series of further abstractions of ~~these~~ 'sensory' data at various levels up the neuraxis through such processes as 'memory', 'association', 'interests', 'appetites', 'thinking', 'feeling', until, through cortical abstracting processes involving analysis and synthesis (differentiation and integration), forms of representation or symbols are devised or selected from the environmental supply of symbols, for purposes of communication. This process of abstracting in different orders up the neuraxis until cortical areas of symbolization are reached is dependent for its proper functioning upon the finite velocity of the nervous impulses and the orderly, hierarchically arranged structure of the nervous system. Thus, disturbances (identifications) of orders of abstractions result in such possibilities as identifying in value the memory of an experience with an actual, 'sensory' experience, the identification of 'feeling' states ('thalamic' abstractions of 'pleasure' or 'pain',) with lower level 'sensory' data or with higher level evaluations such as 'ideas'.

'notions', which are often pathologically devoid of affect; and the treatment of symbols such as words or images as if they were objects or 'sensory' perceptions. Such confusions of levels of abstractions in the human nervous system may be brought about by physico-chemical disturbances of nervous colloids, produced on the one hand by traumatic, degenerative, inflammatory, agencies, and on the other hand, by so-called 'emotional shocks', affective states of social groups as in 'mob hysteria' and other stimuli connected with symbolic aspects of the environment. The deliria of fevers, the delusions of neuro-syphilis, the hallucinations and delusions of schizophrenia, the psycho-physiological symptoms of hysteria as well as "normal" illusions, dreaming, and much socially standardized behavior have this mechanism of confusion of levels of the abstracting processes of the nervous system as their common denominator. In it we find the neuro-semantic mechanisms of the chief source of mis-evaluation--psychopathological identification.

Those symbol-systems known as languages are among the highest forms of abstractions made by human nervous systems. The most pervasive and neurologically important feature of the human environment, particularly for civilized society, is evaluation involving language. The education of the child into a socially adapted adult depends upon its nervous capacities to acquire the meanings, evaluations, orientations, relationships, necessary for adaptation. These are mostly represented by language; and the child must learn to manipulate the linguistic symbolism efficiently enough to communicate his own abstractions. The neural mechanisms subserving the sensor-motor aspects of language are not, in themselves, specifically human; parrots can imitate human speech. But the neural mechanisms subserving meaningful language are specifically human and are best labelled after Korzybski, neuro-semantic mechanisms. Neuro-semantic mechanisms are those responsible for the meanings, evaluations, significances, of various types of reactions and symbolism. Adaptation of the child or adult to the human environment involves neuro-linguistic and neuro-semantic mechanisms working as a unity. Yet these mechanisms, because neurological, are rudimentary in infancy, not fully mature until the end of the second decade of life. These considerations would indicate that in our present educational techniques we may be exposing immature nervous systems to symbolic stimuli which they are not prepared to evaluate and react to properly due to incompletely developed cortical and other centres.

Pavlov and his followers have established the importance of so-called conditional reflexes in animal nervous reactions. They have shown the significance of space-time relations between the stimuli used to establish conditional reflexes and that the more complex these relations are made the higher the degree of integration and development of the nervous system necessary to handle them without "breaking down". Confusion of orders of abstraction was thus experimentally produced in dogs with resultant behavior disturbances comparable to the symptomatology of human neurosis or even psychosis. Pavlov himself has stated '...men are apt to be much more influenced by words than by the actual facts of the surrounding reality.' Through experience in the neuro-linguistic and neuro-semantic environment, associations, relations, meanings, evaluations, are built around some words, or other symbols, which may in this way come to govern a human 'conditional reflex' or human semantic (evaluational) reaction. If the order of such stimuli is such that the capacities of the nervous system are taxed beyond their structural limits, identifications or confusion of orders of abstraction will occur with the production of pathological neural behavior. This is seen in cases where there is too-rapid stimulation (frequency) and too-complex stimulation (extent, area) of immature nervous systems.

Verbal symbols representing higher order abstractions made by adult nervous systems cannot be handled properly by the relatively lower order capacities of immature nervous systems, so that identification in value (confusion of orders of abstracting) must occur and lead to inappropriate, mis-evaluating, forms of behavior. Roughly speaking, infan-

tile nervous systems are predominantly 'thalamic' in their structure and function so that the reactions they mediate are of an unstable, volatile, primitive, animalistic and strongly 'emotional' character in which the extremes of pleasure and pain form the affective basis for 'egocentric', asocial varieties of adaptation, orientations,. Semantic reactions acquired through 'conditioning' in this phase of neural development may appear in adult life as animalistic behavior, primitive dualistic 'philosophies', hedonism and general asocial conduct -- in a word, adult infantilism. Adult nervous systems, if properly developed, are or should be predominantly cortical in their structure-function, so that the behavior they mediate is more stable, less volatile, discriminatory, characterized by the control and elaboration of the affective products of thalamic centres, with the result that the orientation of the adult shows social interests predominating over infantile self-centred ones. The semantic reactions of complete adults show flexibility appropriate to the flux and variability of surrounding reality unlike the rigid, dogmatic, absolutistic, evaluations adopted by immature nervous systems. 'Cortical' behavior might be spoken of as fully conditional; 'thalamic' behavior as characterized by limited or low order conditionality. Reactions which are fully conditional show freedom from identifications because orders of abstraction are not confused and consequently the reactions are appropriate to the stimuli, none of which are actually identical. Reactions mediated by infra-cortical mechanisms (which are less fully conditional) are more automatic, more animalistically reflex, and based upon identifications produced by failure or inability to abstract differences as well as similarities in environmental situations. 'Identifications' are normal at animal and pre-adult levels of nervous development but are pathological at human adult levels of development.

Symbols and symbol-systems should record the observations of order and relations made by human beings adapting to their surrounding environments. The process of abstracting at various neural levels involves a set of relations no different in principle from the physico-chemical, colloidal behavior of simple organisms adapting to their environments. Memory, associations, are thus an expression of physico-chemical, colloidal, (dynamic) structural, changes in nervous protoplasm and probably not essentially different from local and general immunity-reactions of tissues or so-called allergy. When lower order abstractions are symbolized, energy transformations occur such that symbols become neurological factors, comparable to catalytic agents and enzymes, capable of releasing or transforming stored energies. This would explain, partially at least, the so-called power of language as shown in political propaganda, mystico-religious utterances, and the general over-valuation of verbalism characterizing certain present-day educational trends. When words, or other symbols, are identified in value with the abstractions they were designed to represent, objectifications occur; words are treated as objects, 'thoughts', 'feelings', and may be collected much like monetary symbols or property deeds. They then become stimuli for 'thalamic' reactions because they are confused with lower order 'realities'. This state of affairs is invariably pathological and is comparable to fetichism where a single characteristic of a person or situation may be reacted to as if it were the total person or situation. Verbal fetichism is also comparable in principle to alcoholism or drug addiction. Word-addiction may lead to equally disastrous states of 'intoxication' and detachment from reality. Apparently it subserves equally infantile self-centred goals of power and prestige, hostility,. In a class of life adapting itself to its environment chiefly through the mediation of neuro-linguistic and neuro-semantic mechanisms those who can manage these mechanisms best will have the most power. But they can misuse that power toward the destruction of themselves and others. Through dogmatism, absolutism, they can force upon immature nervous systems false-to-fact knowledge in the form of superstitions, obsolete creeds and cosmologies, primitive codes of behavior,. Through misleading, 'emotionally' toned verbiage they can over-stimulate immature nervous systems because the cortical levels are not sufficiently developed to act as semantic buffers between the symbolic environment and the lower centres. The mere failure to realize that such static forms of re-

presentation as words are constantly lagging behind the dynamic realities they are used to represent, may lead to maladjustments comparable to the potential dangers of flying by yesterday's weather-map. Statements, like maps, should be dated.

Words, or other symbols, used for the communication of observed relationships constituting adaptive knowledge, are inseparable from their meanings. Meanings are found in the associations, relations, evaluations, affects and other semantic reactions which are going on in an interrelated way at sub-verbal levels of neural activity. Lower neuro-physiological centres are in more direct contact with happenings belonging to the internal or external environments of an organism. Through the abstractions made at lower neural levels the primary adaptations are mediated. These primary reactions of human organisms are concerned with individual and racial preservation. They depend upon neuro-muscular, neuro-humoral and other mechanisms of a diffuse type for the expression of such 'thalamic' states as hunger, rage, fear, pain, sexual desire, . . . They may be 'inhibited', delayed, modified, by higher neural levels only in proportion to the functional development of higher centres and their integration with lower, 'executive' ones. When such direct, diffuse, automatic and reflex types of adaptation occur, their analogies to animalistic and infantile behavior (mostly pathological for adult humans) is so striking that they are often labelled as such or spoken of as 'instinctive', 'emotional', 'thalamic', . . . Yet, these responses may become quite definitely patterned, both individually and racially, so that they function as dynamic symbols to those observing such manifestations, representing and communicating lower levels of abstraction much closer and more similar to apparent reality than are static symbols such as words. Because they are infra-cortical and dynamic they are necessarily characterized by immediacy and evanescence. In certain situations such as early education, the arts and psychotherapy, they are likely to be often more effective vehicles for the communication of semantic (evaluational) reactions coded by higher interpretative centres. These dynamic forms of communication have been institutionalized as dance, pantomime, drama, music, . . . and reported even in the plastic arts including architecture. And they are often individualized as gesture, 'conversion hysteria', 'organ jargon', and other somatic reactions. As a class they might be labelled thalamic communications. It is important to realize that such dynamic forms of representation and communication may be utilized to express more closely higher neuro-semantic (evaluational) reactions than merely cortical symbolisms.

Education of the present day utilizes, principally, linguistic forms of representation. Verbal symbol-systems and their meanings are only fully comprehensible to functionally mature nervous systems, so that if not used with proper evaluation verbal technique of communication may produce neuro-semantic blockages such as identifications, mis-evaluations and other confusions of orders of abstractions leading to psycho-pathological reactions and eventually overt behavior. Verbal symbols are static abstractions and unless dated are apt to portray a static, out-of-date world-picture misleadingly unlike the actual dynamic complex of events with which the developing child and future adult has to deal. Because of their static character and their amenability to extra-neural representations through writing, printing, . . . language symbols have had the general effect in the past of "freezing" knowledge so that in the human symbolic environment creeds, doctrines, beliefs, . . . lag behind technological advances essential for day-by-day adaptations.

When the structures of symbolisms are systematized by rules of older 'logics', syntax, usage, . . . they become semantically rigid through the creation of categories, canons, of 'thinking', and other products of classical 'logicians', 'philosophers', priests, . . . and similar symbol manipulators. Terms such as 'space', 'time', 'body', 'mind', 'emotion', 'intellect' represent elementalistic notions of reality, abstracted by primitive humans, and transmitted down through the ages to immature developing nervous systems which can do little else than objectify such terms and create delusional, non-existent, . . .

entities. Thus, objectified characteristics and qualities form the basis for demonological systems ranging from primitive religious to psychoanalytical., formulations. They should, of course, be replaced by non-elementalistic terms which do not split verbally what at lower levels of abstraction is evaluated as a unified, indivisible set of relations. Primitive systems of symbolism insidiously establish standardized neuro-semantic reactions appropriate to simpler human environmental conditions but inappropriate for 'modern' life. Our own 'logic' is predominantly Aristotelian and involves two-valued (either-or) forms of 'thought', categories, sanctions., whereby essentially different events may by verbal definitions be evaluated as 'identical'. Syllogistic, antithetical and categorical 'thinking' are products of such primitive 'logical' methods and are ground into our nervous systems by 'classical education' so that, unaware of neuro-semantic mechanisms, we may throughout life automatically identify some characteristics of objects with the objects themselves, unique individuals with man-made schemes or classes of individuals, generalizations with particulars, or inferences with descriptions., to mention only a few of the many neuro-semantic abuses, which may in turn affect the reactions of lower centres involved in life adjustment. Language-systems need simple structural reconstruction to make them less static and indefinitely flexible in structural correspondence to the indefinitely-many uniquely individual and non-identical facts of life as revealed by science 1938.

Originating in pre-literate society, language has been the principal mechanism of time-binding and, as indicated, has shaped our semantic reactions. Primitive structural assumptions have become codified in the structure of language, rules of 'logic'., and largely determine our orienting beliefs, creeds, doctrines.,. Lacking the extra-neural instruments of scientific investigation, which extend the powers of abstraction of the human nervous system from macroscopic, 'sensory' levels into microscopic and, recently, sub-microscopic levels of observation, pre-scientific man, ancient or contemporary, could only produce a language based upon crude 'sense' abstractions by means of which to communicate adaptive knowledge. Such structurally primitive language-systems become parts of the neural environment of children and because of their false-to-fact structural assumptions and sensory imagery., they may over-stimulate, or at least strongly condition, 'thalamic'., mechanisms. As the children mature and become adult they may remain embedded in such a neuro-linguistic and neuro-semantic environment which does not utilize higher centres enough, and continues to operate on 'thalamic' levels. In some such way 'thalamic' mechanisms of behavior may assume dominance over even higher centres, with persistence of animalistic and infantile behavior in chronological adulthood. These neuro-linguistic and neuro-semantic factors of child development, then, may be largely responsible for adult infantilism, yet, because we have taken for granted such a commonplace of human activity as language, and its structure, we have done little or nothing about such dangers.

A large proportion of the neuro-linguistic environment of children consists of 'emotive' phraseology connected with 'morality', 'ethics', primitive 'religious' orientations, and other dynamic factors producing social adaptation such as aphorisms, slogans, mottoes.,. Infra-cortical or 'thalamic' modes of reactions and behavior are established which may involve strong affective states such as those of rage, fear, anxiety, guilt, exaltation and the like. Frequency and intensity of such semantic reactions may produce structural changes in semantic mechanisms of reaction, recognizable in later years as organ pathology.,. While such 'emotive' verbalism may convey useful high order generalizations appreciable by the cortical mechanisms of well-developed adults it is likely to be abstracted too literally by the predominantly thalamic mechanisms of children. Fundamentalistic religious evaluations are a good example of this confusion of higher, more generalized abstractions with lower ones. Children suffer enormously from such confusions as can be seen often in their objectification of fairy-tales, mythologies, ghost stories, radio 'thrillers'.,. Many neuroses and psychoses appearing in adult life are clearly traceable to the misvaluation of emotive and metaphorical verbalism occur-

ring in the neuro-linguistic and neuro-semantic environments of children.

We are concerned, as physicians, with prevention of disease. Much attention is paid to the elimination of infectious, toxic and other physico-chemical agencies capable of disturbing the delicate colloidal equilibria of human protoplasm but, until recently, we have not even understood the equally disturbing effects of certain neuro-linguistic and neuro-semantic factors on the colloids of the nervous system, let alone their elimination. In the growth process we guard against physical crippling fairly efficiently but vital statistics reveal our relative failure to prevent 'mental' or semantic crippling. It is now desperately necessary to 'disinfect' our neuro-linguistic and neuro-semantic environments in order to prevent the alarming increase of deviant, psycho-pathological, human behavior ranging from mild disturbances of the learning process such as 'reading' difficulties to the major psychoses. Although so-called 'mental' hygiene and 'child-study' clinics aim at this type of preventive medicine their efforts are too limited because the workers in these fields have not been in possession of a general theory of symbolism and evaluation applicable to education as-a-whole and comparable to general theories of infection, immunity, underlying sanitation and public health.

Since the formulation of general semantics, clinical results fully justify the expectation that it is possible partially to eliminate neuro-linguistic and neuro-semantic irritants from the symbolic environment, 'immunize' against their dangers and in many cases to 'desensitize', or 'cure'. As physicians discovering 'pathology' and methods of treatment in individual cases, we should generalize our findings for application to groups of individuals through educational channels. Neuro-psychiatry re-educates individual neuro-semantic disorders.; education in any society should become generalized neuro-psychiatry.

SUMMARY

(1) Reformulation of the essentially unified principles of human-biology is needed in order to eliminate the differences of orientations and confusions of understanding between psychiatrists, pediatricians and educators.

(2) Neuro-psychiatry emphasizes the role of symbolism in the functioning of human nervous systems by calling attention to the inter-related neuro-linguistic and neuro-semantic (evaluational) factors in human reactions to their environments.

(3) Languages, and other forms of symbolism, possess definite structures and convey to those using them the evaluations and life interpretations belonging to the point of view of the 'times' of their original formulations.

(4) Children's nervous systems, being structurally undeveloped, cannot evaluate properly and thus may form inappropriate evaluations leading to psychopathological states of identification, behavior disturbances, etc.

(5) Certain varieties of 'logic', terminology and emotive phraseology are discussed in regard to their neurological effects.

(6) It is concluded that physicians should extend their field of so-called preventive medicine to include the symbolic features of human environments by unifying and generalizing general semantics and neuro-psychiatry for educators.

BIBLIOGRAPHICAL LIST

Some Publications Relating to General Semantics

- Campbell, D. G.: General Semantics. Implications of linguistic revision for theoretical and clinical neuro-psychiatry. *American Journal of Psychiatry*, 1937: 93, 789.
- : Medicine, general semantics, and language. Submitted for publication in *Psychosomatic Medicine*. (First issue to appear early in 1939.)
- : Posture: a gesture toward life. *Physiotherapy Review*, 1936: 15, 43.
- : Visceral behavior in neuroses. *Canadian Medical Association Journal*, 1936: 34, 422.
- Chase, Stuart: "The Tyranny of Words" (Chapters I, VI, especially). Harcourt, Brace, New York, 1938. (Excerpts in *Harpers Magazine*, Nov., 1937 to Jan., 1938.)
- Haight, Raymond: Wise man, what next? *Rob Wagner's Script* (Beverly Hills, Calif.), May 14, 1938.
- Herrick, C. Judson: The factors of neural integration and neural disorder. In "The Problem of Mental Disorder" (Committee on Psychiatric Investigations, National Research Council). McGraw-Hill, New York, 1934. Pp. 212-214.
- Kendig, M. M.: A proposed research investigation valuable in the improvement of teaching on the junior college level: application of a method for scientific control of the neuro-linguistic and neuro-semantic mechanisms in the learning process. Paper for Master's degree, Columbia University, 1935. Copies on request to Institute of General Semantics, Chicago.
- Keyser, G. J.: Mathematics and the science of semantics. *Scripta Mathematica*, 1934: 8, 347. (Published also in another and slightly shorter version, under the title, The foundations of a science of sem., in *The New Humanist*, April 1934.)
- Korzybski, Alfred: (Separately listed, below.)
- Macdonald, Roderick: A study of symmetry in the centarchinoides based on behavior, with special reference to *lytechinus variegatus*; including a short discussion of linguistic difficulties in describing biological phenomena. *Proceedings of the American Philosophical Society*, 1936: 76, 87.
- Michte, Sarah: A new general language curriculum for the eighth grade. *Modern Language Journal*, 1939: 22, 343. Copies on request to Institute of General Semantics.
- Muller, H. J.: Pathways in recent [literary] criticism. *Southern Review*, 1939: 4, 197.
- Murray, R. St. E.: The differential aspect of semantic component in relation to psychiatry. *Journal of Nervous and Mental Diseases*, 1935: 82, 525.
- Morris, C. D.: A preamble to an organic theory of knowledge. *Philosophy of Science*, 1934: 1, 460.
- Osburn, W. J.: What next in school administration? *Educational Administration and Supervision*, 1936: 21, 107.
- Paton, Stewart: Co-operation or revolution. *Forum and Century*, 1934: 32, 126.
- Polakow, Walter N.: Science's contribution to social studies. *Progressive Education*, 1935: 12, 105.
- : Correspondence (Was Korzybski Irrelevant?). *New Republic*, 1934: 80, 312.
- Reiser, O. L.: "Philosophy and the Concepts of Modern Science." Macmillan, N.Y., 1935.
- : Non-aristotelian logics. *Monist*, 1935: 45, 100.
- : Modern science and non-aristotelian logic. *Monist*, 1936: 46, 299.
- : Symbolic logic and the frontiers of social science. *Psyche*, 1936: 15, 138.
- : Non-aristotelian logic and the crisis in science. *Scientia*, 1937: 51, 137.
- Sargent, Porter: "Human Affairs 1938" (pp. 209-214 especially). Introduction, separately printed, to the "Handbook of Private Schools", 22 ed., 1937-38. Boston.
- Sisson, E. C.: Symbolic logic and "embedding language". *Philosophy of Science*, 1937: 4, 456.
- Szyver, Selden: The trend of education. *Washington Education Journal*, 1934: 13, 5; and *Educational Bulletin*, National Broadcasting Company, 1934: 4, 7.
- Sutton, Vida R.: The script of the "speaking-press" (interview with Countess Korzybska).

Education, 1936: 67, 21.

Trainor, J. C.: The contributions of Alfred Korzybski. *Psyche*, 1936: 16, 165.

Tyler, A. Ranger: The modern Babel. *New Democracy*, 1935: 3, 190.

Wheeler, R. H.: A set of postulates for educational theory. *Journal of Educational Research*, 1935: 28, 321 and 29, 187.

----: Organismic logic in the history of the sciences. *Philosophy of Science*, 1936: 3, 26.

White, W. A.: "20th Century Psychiatry" (pp. 163-168 esp.), Norton, N. Y., 1936.

Reviews of "Science and Sanity":

Acklom, G. M.: *New York Times Book Review*, February 11, 1934, p.4.

Alexander, E. B.: *The Personalist*, Univ. of Southern Calif. 1934: vol. 15, no. 4.

Bell, Eric T.: *American Mathematical Monthly*, 1934: 41, 570.

Benjamin, A. C.: *International Journal of Ethics*, 1934: 44, 377.

The Bookshelf (Nation's Schools Pub. Co.), 1934: vol. 13, no. 5.

Boston Transcript (signed "E. N."), January 9, 1935.

Brown[ie]: *Psychiatric Quarterly*, 1934: 8, 380.

Hook, Sidney: *Saturday Review of Literature*, 1934: 10, 546.

Jelliffe, S. E.: *Journal of Nervous and Mental Diseases*, 1935: 82, 356.

Levi-Bianchini, M.: *Archivio Generale di Neurologia*, 1935: 16, 101.

Lillie, R. S.: *The Collecting Net* (Woods Hole, Mass.), 1933: 9, 403.

Nagel, E.: *Journal of Philosophy*, 1934: 31, 80; and *New Republic*, 1934: 80, 327.

Nature (signed "T. G."), 1934: 134, 617.

Ogden, C. M.: *Philosophical Review*, 1935: 44, 83.

Reiner, Markus: *Psychoanalytic Quarterly*, 1934: 3, 641.

Science News Letter, March 31, 1934.

Temple, G.: *Journal of the British Institute of Philosophy*, April 1935, p.45.

Tyler, A. R.: *Knickerbocker Press*, Albany, N. Y., December 10, 1933.

White, W. A.: *Mental Hygiene*, 1934: 18, 462.

By Alfred Korzybski:-

"*Manhood of Humanity. The Science and Art of Human Engineering.*" Dutton, N. Y., 1921.

Fate and freedom. *Math. Teacher*, May 1923.

The brotherhood of doctrines. *The Builder* (St. Louis, Mo.), April 1924: 10, 106.

Time-binding: the general theory. Presented before the Internat. Math. Congress, 1924, Toronto, Canada. N. Y., privately printed.

Time-binding: the general theory. Second paper. Before the Washington Soc. Nervous and Mental Diseases, June 25, 1925; and the Washington Psychopath. Soc., March 13, 1926. Washington, D. C. Privately printed.

Discussion of 'Mental Hygiene and Criminology' (T. Alexander). *Proc. First Internat. Congress on Mental Hygiene* (Washington, D. C., May 1930), vol. 1, pp. 794-795. N. Y., 1934.

A non-aristotelian system and its necessity for rigour in mathematics and physics. Presented before the Amer. Math. Soc., at New Orleans, Dec. 28, 1931. Reprinted in "Science and Sanity" as Supplement III.

"Science and Sanity, an Introduction to Non-Aristotelian Systems and General Semantics". Science Press, Lancaster, Pa., 1933.

An outline of General Semantics. (First reproduced in the present collection.) 1934-1935.

Neuro-semantic and neuro-linguistic mechanisms of extensionalization. General Semantics as a natural experimental science. Paper presented before the Psychology section of A.A.A.S., St. Louis, December 1935. *Am. J. Psychiatry*, 1936: 93, 28.

Extensionalization in mathematics, mathematical physics, and general education. General Semantics. Presented before the Mathematical section, A.A.A.S., St. Louis, December 1935. (Reproduced in this collection.)

The science of man. (A review of Carrel's "Man, the Unknown".) *Am. J. Psychiatry*, 1937: 93, 1343.

"General Semantics". (Stenographic report of seminars at Olivet College; mimeographed.) Olivet College Book Store, Olivet, Mich., 1937.

Seminar at the Institute of General Semantics, Chicago, 1939. In preparation.